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EXTILE
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LEACHING
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OBER 23, 1944
ME 33, No. 22

AMERICAN DYESTUFF REPORTER

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Faster **Faster**

DIPHENYL FAST BLUE 10 G L

(Patented)

A distinctly different greenish blue, particularly useful as a self shade and in combination to produce many of the current shades of blue.

Diphenyl Fast Blue 10 G L is definitely faster to light, yet gives level dyeings such as few of the so-called "fast to light" direct colors offer.

Drapery, curtain, upholstery cloth, automobile fabric makers and the like will find this new blue a valuable accessory when the extreme in fastness to light is expected of a direct dyestuff.

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THE SPEEDIEST WETTING AGENT AVAILABLE FOR TEXTILE PROCESSING

DECERESOL* OT is shipped to you in liquid form for convenience in handling and for instantaneous addition to the wet processing bath without preliminary make-up or manipulation. You are assured of speed in application, saving in time and labor.

The remarkable wetting, penetrating, dispersing, and dye leveling properties of DECERESOL OT also mean speed in processing and better results. There are at least thirty different ways DECERESOL OT will save you time, cut costs, and improve production.

Write to Cyanamid for complete information or ask our representative to assist you in using DECERESOL Wetting Agents for dyeing all types of fibers.

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DECERESOL OT *is shipped in standard 55-gallon stainless steel drums having an exact net weight of 450 pounds, or in 12-gallon boxed carboys with an exact net weight of 100 pounds.*

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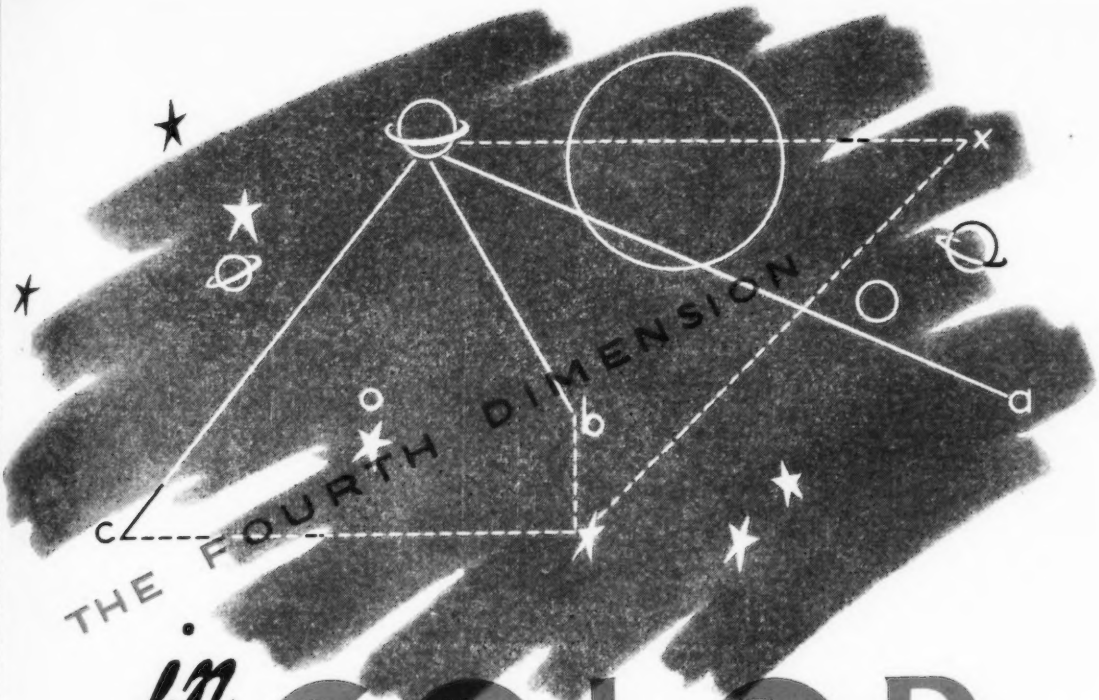

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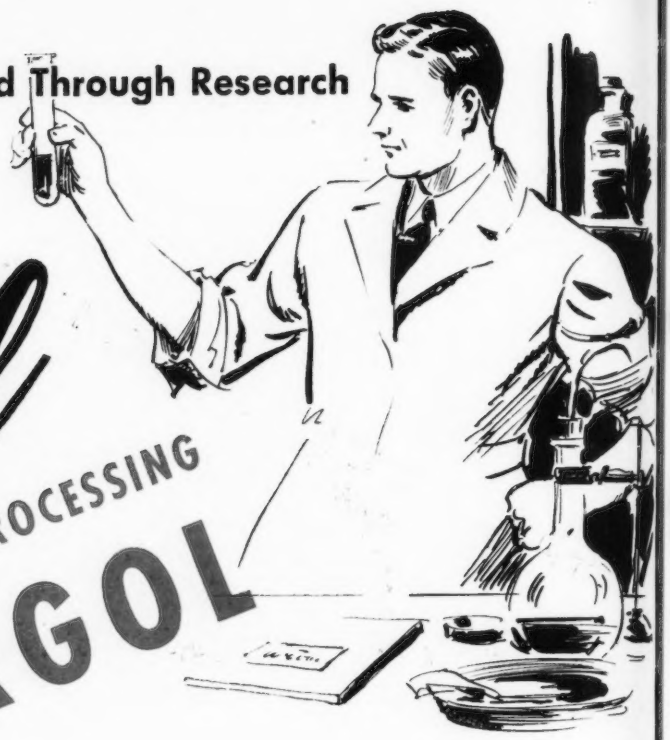

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NEW! QUAKER LACE TABLECLOTHS WEARING THE "CROWN"* TESTED TAG

No. 34 of a series—from our files on the new "CROWN" Tested Plan

The cloth shown here—a combination of 75% filament Viscose rayon and 25% cotton—has been machine-washed 15 times. Others have been wash-tested up to 51 times. The machine used was the agitator-type—which means this cloth passed the severest test offered by any commonly used home washing equipment. All these "Amber light" Quaker Lace tablecloths are copies of museum pieces.

BELIEVE IT OR NOT, *these* lace tablecloths can actually be safely laundered! They need no pampering, no "kid glove" handling. Here's a scoop indeed . . . and here's how it came about.

Quaker Lace Company, as you may know, is one of this country's oldest and largest manufacturers of lace products. And when they brought out this new line of rayon-and-cotton tablecloths, they knew they had something way out of the ordinary. For these cloths looked like the kind women have always hesitated to wash even by hand . . . yet they stood up under the most rigorous washing tests! So . . . just to prove in advance how much beauty and serviceability these tablecloths really offer . . . Quaker Lace Company called on the CROWN Tested Plan.

And the results speak for themselves! Those cloths certainly have what it takes. The tests predict they can be hand-washed or machine-washed at 105° F. Their resistance to fading and to sunlight is excellent . . . no color loss was observed after 40 hours in the Fadeometer. And their beauty really lasts . . . throughout all laundering tests, their permanence of finish remained unchanged.

So these new Quaker Lace tablecloths wear the CROWN Tested Amber Tag. And consumers who buy them can expect plenty of satisfaction and long wear. For as that tag says, "The cloth needs no special care. It can be washed either by hand or in a good washing machine."

Here's extra proof that you don't have to sacrifice eye appeal for performance appeal. Who could ask for better proof of the value of the CROWN Tested Plan?

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A better way to buy rayon fabrics—This identification is awarded only to fabrics containing CROWN Rayon, after they have passed the CROWN Tests for serviceability. These tests predict the fabric will not change visibly in color or in texture, nor in size more than 2%, if instructions are followed. Samples of every dye lot of fabric have been tested against minimum requirements set and maintained by

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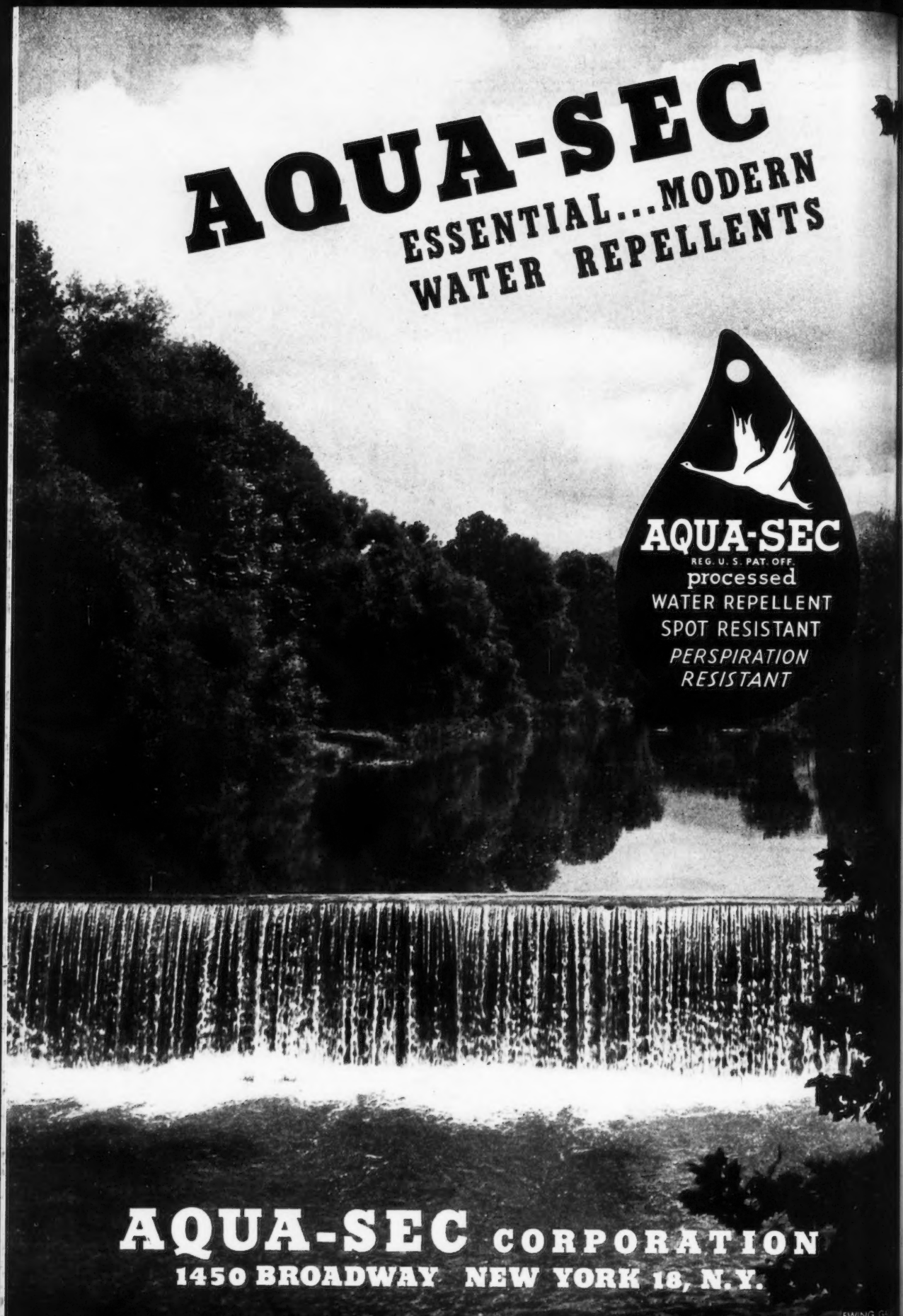
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AMBERTEX is a heavy-bodied, free-flowing starch chemical... with penetrating qualities that insure full discharge of the ground color, and cohesive properties that provide razor sharp details . . . even on the most difficult fabrics.

Study the swatches reproduced above—*unretouched.* They illustrate accurately the difference between printing with ordinary textile gums and printing with National's AMBERTEX.

AMBERTEX is highly resistant to the thinning out action of strong alkalis. It is readily diluted with water. It has excellent rinsibility, and is equally suitable for white discharge and direct color printing by either roller machine or screen on all types of fabrics.

AMBERTEX is highly economical. Compare it with the gum you are now using. Send for sample *today.*

Offices: 270 Madison Avenue, New York 16; Boston, Philadelphia, Chicago, Indianapolis, San Francisco, and other principal cities.

National also produces: KOVAT, a cold water swelling gum for vat printing; VAT GUM 36 (cook-up type) for vat colors on cotton and rayon; AZO GUM for Rapidogen, Indigosol and Napthol colors; RESYN UF for crease-proof, shrink-proof, and permanent finishes; FIBERTEX for sheer crisp finishes.

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4. Permalene W.S. can be used in the dyeing of Aral Since strong alkalies are not practical and the pH the bath is very important, Permalene W.S. makes excellent assistant as the pH of its bath does not t to build up.
5. In the washing of prints Permalene W.S. has unus properties of dissolving and retaining in solution many compounds used in printing the fabrics and wh often precipitate in the soaping-off operations.

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"More hat ... more color"

SAYS MR. JOHN OF JOHN-FREDERICS, INC.

...brilliant designer of millinery and accessories for women of taste throughout America. "Designers are creating in a new spirit of freedom," according to this authority, "and women are expressing their preferences through lavish use of color. Hats and accessories set the pattern for more formality in dressing, and combinations of color are of utmost importance."

This artist combines dark and light toned fabrics in hats and related accessories. Rich tones of plum, fuchsia and green, with medium pastels of blue and mauve for lighter touches are featured throughout his collection.

Mr. John forecasts foliage colorings for spring . . . all the greens, with emphasis on the darker tones, and "burnt" colorings in a range from rust to hemp and the light natural tints.

Calco colors are authoritative for every branch of the great fashion industry. Calco's Service Department will gladly assist you on color selection and application. CALCO CHEMICAL DIVISION, AMERICAN CYANAMID COMPANY, Bound Brook, New Jersey. New York, Chicago, Philadelphia, Boston, Charlotte, Providence.

COLORS BY CALCO

John-Frederics hat in tones of plum and fuchsia; harmonizing gloves. Green accents in hat and bag.

WOOL DYEING *Streamlined*

CALCOMET WOOL DYES offer the colorist, for the first time in dyeing history, the advantages of all three chrome methods in one new, scientifically evolved, improved metachrome process.

It is now possible to achieve the time-saving and close-color-control features of the metachrome process, and at the same time retain the advantages of levelness, fastness, and the ability to produce rich, heavy-bodied shades characteristic of the other chrome dyeing methods.

Mill runs with Calcomet dyes have demonstrated definite savings in bichromate, an item of utmost importance during the chrome shortage. Because of better control, the correct shade is achieved more quickly and dyeings seldom have to be done over. This means economy in materials, savings in time, labor, and power.

Calcomet dyes are available in eleven shades, including Calcomet Black J, a full jet black which can be produced for the first time with the metachrome dyes.

Calco Technical Service is available for practical assistance in initial dyeings. See your Calco representative regarding a demonstration. CALCO CHEMICAL DIVISION, AMERICAN CYANAMID COMPANY, Bound Brook, N. J., Chicago, New York, Philadelphia, Boston, Charlotte, Providence.

PATENTS COVERING THE METHOD AND THE CALCOMET DYES HAVE BEEN APPLIED FOR

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Keep Dye and Fabric Quality Up with Hooker Chemicals

During World War I, there may have been some reason for the public to complain about color fading, and about fast dyes that *weren't* fast. At that time American dye manufacture was still an infant industry. With the advances that American dye and textile chemists have made since that time there is no reason for any quality deterioration in dyes or fabrics even during the war.

There is one way of making sure that your products will be up to pre-war standards. Use Hooker chemicals. Because of war's demands, you may not be able to get all the Hooker chemicals you need when you want them. However, the Hooker chemicals that are available are of the same uniform dependable high quality that has made Hooker the source of discriminating buyers.

Many of your needed chemicals are still available in reasonable quantities and for prompt shipment. Some of the commonly used Hooker chemicals in the dye and textile industry are listed below. Other Hooker chemicals are listed in Bulletin 100, Hooker General Products List. Send for a copy.

PRODUCT Chemical Formula • Molecular Weight	DESCRIPTION	USES
Aluminum Chloride, Anhydrous $AlCl_3$; 133.3	Gray crystalline solid.	Catalyst; dye making.
Antimony Trichloride, Anhydrous $SbCl_3$; 228.1	Yellowish solid.	Catalyst, dye making; mordant in textile printing; moisture and fire-proofing textiles.
Benzoyl Chloride (Benzenecarbonyl Chloride) C_6H_5COCl; 140.5	Water clear liquid, soluble in ether, reacts with alcohol and water.	Highly active source of benzoyl group. Manufacture of benzophenone, benzyl benzoates, dyes and pharmaceuticals.
Cyclohexanol (Hexahydro Phenol) $C_6H_{11}OH$; 100.1	Clear, colorless liquid.	Solvent.
Lauryl Pyridinium Chloride $C_5H_5NC_{12}H_{25}Cl$; 293.4	Yellow gray semi-solid.	Cationic detergent.
Metanitrobenzoyl Chloride $C_6H_4NO_2COCl$; 185.5	Yellow to brownish liquid, partially crystallized.	Manufacture of dyes.
Monochlortoluene $C_6H_4Cl\text{-}CH_3$; 126.5	Clear, colorless liquid.	Solvent, dye intermediate.
Orthodichlorbenzene $C_6H_4Cl_2$; 147	Clear, odorless liquid.	Solvent, dye intermediate.
Paranitrobenzoyl Chloride $C_6H_4NO_2COCl$; 185.5	Yellow crystalline lump material.	Manufacture of dyes.
Sodium Tetrasulfide Na_2S_4; 174.23	Aqueous solution containing 40% by weight of compound. Dark red liquid.	Manufacture of sulfur dyes.
Sulfuryl Chloride SO_2Cl_2; 135.0	Light yellow liquid.	Chlorinating agent. Forms chlorides and anhydrides of organic acids.
Thionyl Chloride Refined and Technical $SOCl_2$; 119	Colorless to yellow or pale red liquid.	Chlorinating agent. Forms organic acid chlorides.

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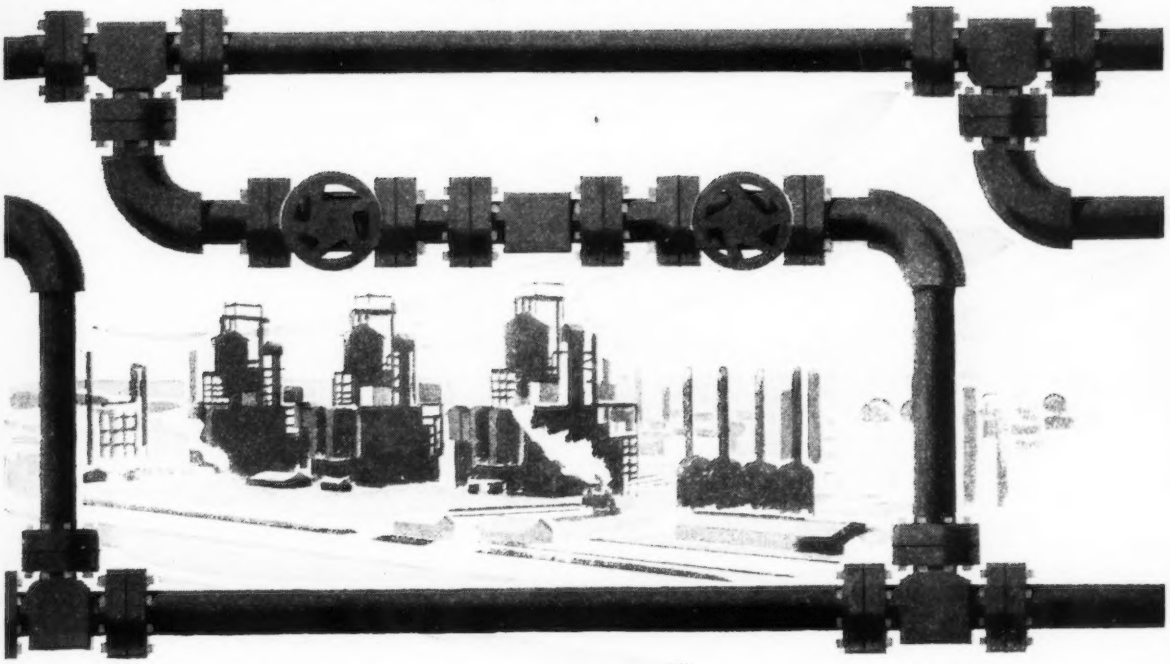
Withstand Virtually All Corrosive Chemicals



Can Be Assembled to Any Plan

PIPE, TUBES, FITTINGS, made of "National" carbon and graphite, or of "Karbate" materials (carbon or graphite made impervious to fluid seepage under pressure) are available in standard sizes for the chemical and process industries wherever corrosion problems exist.

These products, plus "Karbate" centrifugal pumps, Globe and Saunders valves, and heat exchangers, are fabricated into complete conveying and heat-transfer systems of practically any design.

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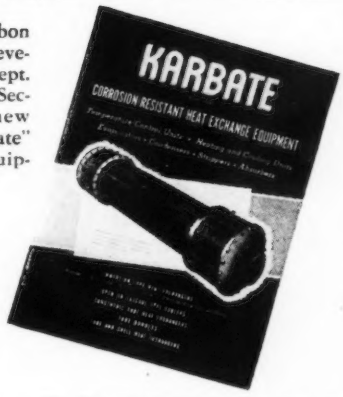

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Phenylethanolamine
Phenyldiethanolamine
Ethylphenylethanolamine
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Diethylhexylamine

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Chloracetoacetanilide
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Present industrial applications of the Amines arise primarily from their ability to neutralize acids. They serve as corrosion inhibitors in special lubricating oils, metal-cleaning compounds, carbon-removers, and slushing compounds for engines. Certain Amines purify the gases in plants making toluene, high-octane gasoline, aluminum, magnesium, and synthetic rubber.

Amine soaps are employed as emulsifying agents in polishes, camouflage paints, and textile specialties. Amines are also used in the production of dyestuffs, pigments, cement addition agents, rubber chemicals, and certain pharmaceuticals.

The research and development work done by Carbide and Carbon Chemicals Corporation with Amines has been repeated with the other families of aliphatic chemicals. Building with atoms and molecules, our chemists and engineers have synthesized many new chemicals, and have produced many others commercially for the first time.

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Most AHCO PRODUCTS fall within the latter class. Invisible in the fabric, and in some cases entirely removed in the finishing, they nevertheless play an indispensable part in creating cloth that is woven better, feels better, drapes better, repels water (in some cases) and which has many other sales building properties.

AHCO PRODUCTS are created in our own laboratories. They are backed by 128 years of experience in the textile chemical industry. Let us recommend an AHCO PRODUCT for your sizing or finishing problem.

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They make better synthetic yarn warps

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An outstanding wetting agent for sanforizing and other types of finishing

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Keeps colors clear and bright

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Leonardo's greatness lay in his VERSATILITY

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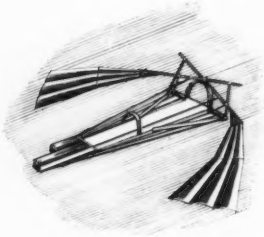

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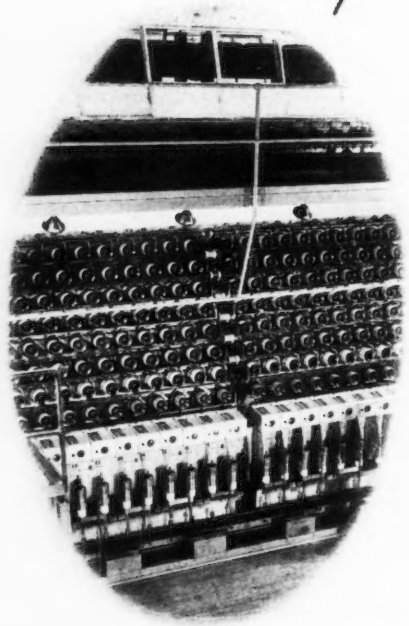
. . . and in dozens of other creations and inventions da Vinci's genius proved inexhaustible.

The greatness of INDUSTRIAL'S, "Continuous Process" *Spun-lo Rayon Yarn lies in its VERSATILITY, too.



The Continuous Process Machine

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*Reg. U. S. Pat. Off.

Industrial RAYON CORPORATION MAKERS OF Spun-lo RAYON YARN BY THE Continuous Process

CLEVELAND, OHIO • NEW YORK OFFICE, 500 FIFTH AVENUE

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Reservations For Advertising Space Should Be Made Immediately As The Critical Paper Situation Limits The Advertising We Can Accept.

★ The Ninth Annual Processing Review Number of the AMERICAN DYESTUFF REPORTER will be published on December 4th, to permit the publication IN ONE ISSUE, of all Inter-Sectional Contest papers presented at the Annual Meeting in Atlantic City, N. J.

★ The publication of these original papers will be of great interest to the chemist, dyer and finisher, as the subjects will be pertinent to today's problems. *The value of display advertising in this issue is obvious.*

★ Due to government restrictions, we are limited in the amount of paper we can use, so early space reservations are imperative.

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440 FOURTH AVE., NEW YORK 16

Here's one manufacturer's experience. He encountered considerable static on acetate staple fiber and tried Stantex 629 by spraying acetate laps with a 1% watery emulsion. This resulted in increased production from his normal 38½-yard laps to 56 yard laps.

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A. P. HOWES
Publisher

LOUIS A. OLNEY, D.Sc.
Directing Editor

NORMAN A. JOHNSON, B.T.C.
Managing Editor

MYRON D. REESER
Advertising Manager

Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

OCTOBER 23, 1944

VOLUME 33 NUMBER 22

American Dyestuff Reporter, Vol. 33, No. 22, October 23, 1944. Published every other Monday. Copyright, 1944, by Howes Publishing Co., 440 4th Ave., New York 16, N. Y. Domestic subscription, $5.00, Canadian, $6.00, Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

Contents

Contents of previous issues can be found by consulting the Industrial Art Index at your library

• Special Articles

The Effect of Wringing upon the Tensile Strength of Rayon Fabric..... 441

Dorothy Siegert Lyle and Dorothy Catherine Black

Study of a Soil Burial Method for Determining Rot Resistance of Fabrics (Concluded)..... 449

D. M. Batson, Dorothea J. Teunisson and N. Porges

• Departments

Trade Notes—New Products..... 458

Abstracts from Contemporary Journals..... 460

• Proceedings of the American Association of Textile Chemists and Colorists

Annual Meeting a Huge Success..... P446

Fall Meeting, Mid-West Section..... P447

Membership Applications P447

Calendar of Coming Events..... P448

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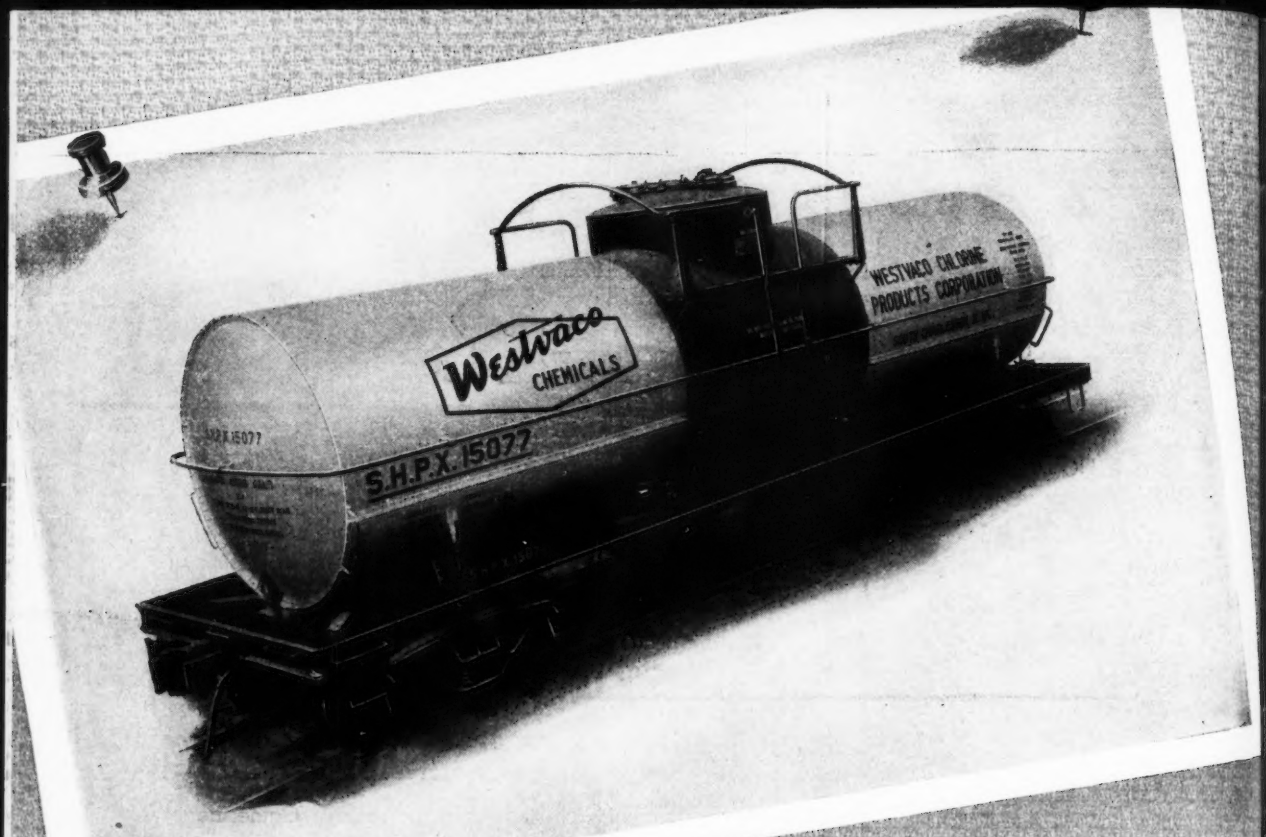

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AMERICAN
DYESTUFF REPORTER

VOLUME 33 OCTOBER 23, 1944 NUMBER 22

The Effect of Wringing Upon the Tensile

STRENGTH OF RAYON FABRICS

DOROTHY SIEGERT LYLE and DOROTHY CATHERINE BLACK

Ellen H. Richards Institute, The Pennsylvania State College

INTRODUCTION

AT a time when there is general concern about the conservation of fabrics by good care, it is important to know how the strength of consumer goods may be preserved.

Since the time when rayon entered the consumer field of textile merchandise, manufacturers have emphasized in labels on yard goods and on textile articles such slogans as *Handle With Care, Squeeze Gently, Do Not Wring.* Consumers moreover by experience learned that, because of the inherent characteristic of rayon that it has a lower breaking strength when wet than when dry, the directions were justified. In recent years, however, technical developments have increased the dry, as well as the wet, breaking strength of the rayon fiber to the point where a question arises as to whether or not this extreme caution is still necessary for the proper conservation of rayon fabrics. Especially is this question pertinent at the present time because of the need for the conservation of labor hours.

Specifically, the point in question is whether or not the breaking strength of a rayon fabric is affected adversely by wringing it during the course of a laundry operation, as opposed to the gentle squeezing methods which are traditionally recommended in handling fabrics made of this fiber content.

The question stimulated a study of the problem in the laboratory of the Ellen H. Richards Institute at The Pennsylvania State College. In the following report, data and findings from the study on the effect of wringing and pressing upon the breaking strength of rayon fabrics are presented.

METHODS OF THE STUDY

Selection of Fabrics

In order to determine whether or not wringing and pressing have any effect upon the breaking strength of rayon fabrics, five types of rayon fabrics were selected on the retail market for the problem. The fabrics were identified by Dr. Frederick Bonnet of the Standards Department of the American Viscose Corporation as follows:

Sample 1. Rose Taffeta (Sutley Crepe) Warp 100/60 American Viscose "Chalkelle" Filling 150/90 Dull. American Viscose Chalkelle.

Sample 2. Rayon Crepe (Clipper Crepe) Warp 100/60 Dull Viscose, Manufacturer unknown. Filling 50/100 Dull Viscose, Manufacturer unknown.

Sample 3. Rayon Crepe (Belding's) Warp 75/50 Acetate, Manufacturer unknown. Filling 75/30 Bright Viscose. American Viscose.

Sample 4. Print Taffeta (A.B.C. Crown Tested) Warp 100/60 American Viscose Chalkelle. Filling 150/90 American Viscose Chalkelle.

Sample 5. Tricot Knit. Dull Acetate. Manufacturer unknown.

Initial Characteristics of the Fabrics

The initial properties of the fabrics were ascertained as follows: fiber content; weave; type of dye used; weight per square yard; thread count per inch; average twist per inch; filaments per yarn;

STEPS IN THE WASHING PROCEDURES

Steps and Conditions	*Method I*	*Method II*
Water Volume	18 Liters	18 Liters
Soap (Neutral)	0.2 per cent solution	.2 per cent solution
Temperature	37.7°±1°C.	37.7°±1°C.
Wetting-out Period	3 minutes	3 minutes
Squeezing suds through fabric	3 minutes	3 minutes
Squeezing water from fabric	x	x
Wringing water from fabric	—	—
First rinse 2 min. 37°±1°C.	Squeeze	Wring
Second rinse, 2 min. 26°C.	Squeeze	Wring
Roll in towel to remove excess moisture	+	+
	Air Dry / Roll in towel Iron 130°C.	Air Dry / Roll in towel Iron 130°C.
	Breaking Strength	Breaking Strength
	Warp Dry Wet / Filling Dry Wet / Warp Dry Wet / Filling Dry Wet	Warp Dry Wet / Filling Dry Wet / Warp Dry Wet / Filling Dry Wet

denier; breaking strength in pounds; bursting strength in pounds; color-fastness to light, crocking, perspiration, and pressing.

The results of these initial tests are shown in Table I, entitled *Initial Properties of the Rayon Fabrics.*

Methods of Laundering

Two methods of laundering were followed. Method I was a widely used procedure for washing rayon fabrics. This consisted of wetting out the fabric for three minutes, squeezing suds through the fabric with the cupped hands gently for three minutes. The suds consisted of

TABLE I
INITIAL PROPERTIES OF THE RAYON FABRICS

Brand Name	*Specimen No. I Sutley Crepe*	*Specimen No. II Clipper Crepe*	*Speciment No. III Belding Crepe*	*Specimen No. IV ABC Fabric*	*Specimen No. V Celanese Jersey*
Cost per yard	$0.59	$0.79	$0.79	$0.79	$1.00
Fiber Content					
(a) Warp	Delustered Viscose rayon	Delustered Viscose rayon	Cellulose Acetate rayon	Delusterized Viscose rayon	Cellulose Acetate rayon
(b) Filling	Delustered Viscose rayon	Delustered Viscose rayon	Lustrous Viscose rayon	Delusterized Viscose rayon	
Weave	Plain	Plain	Plain	Plain	Tricot Knit
Type of Dye used	Direct	Ground-Developed Print-Thioindigoid vat	Acetate and direct	Aniline	Acetate
Weight per sq. yd.	2.61 ozs.	3.10 ozs.	2.82 ozs.	2.85 ozs.	4.67 ozs.
Thread Count per in.					
(a) Warp	100	112	155	96	45
(b) Filling	70	78	101	72	
Average Twist per in.					
(a) Warp	4.5	3.4	2.5	3.3	.....
(b) Filling	3.6	23.5	39.9	3.1	.....
Filaments per yarn					
(a) Warp	60 American Viscose Chalkelle	60 Dull Viscose	50 Manufacturer unknown	60 American Viscose Chalkelle	Manufacturer unknown
(b) Filling	90 American Viscose Chalkelle	100 Manufacturer unknown	30 Bright American Viscose	90 American Viscose Chalkelle	
Denier of Woven fabric					
(a) Warp	100 American Viscose Chalkelle	100 Dull Viscose	75 Manufacturer unknown	100 American Viscose Chalkelle	.....
(b) Filling	150 American Viscose Chalkelle	150 Manufacturer unknown	75 Bright American Viscose	150 American Viscose Chalkelle	.....
Breaking Strength in Pounds					
(a) Warp—dry	46 lbs.	46 lbs.	30 lbs.	35 lbs.	.....
(b) Filling—dry	44 lbs.	51 lbs.	29 lbs.	39 lbs.	.....
(c) Warp—wet	11 lbs.	15 lbs.	17 lbs.	11 lbs.	.....
(d) Filling—wet	15 lbs.	14 lbs.	12 lbs.	15 lbs.	.....
Bursting Strength in Pounds					
(a) Dry	94 lbs.	131 lbs.	77 lbs.	101 lbs.	70 lbs.
(b) Wet	36 lbs.	42 lbs.	39 lbs.	46 lbs.	37 lbs.
Color-fastness					
A. Washing	Class II—First wash Class III—Tenth, through Twentieth Class IV—Thirtieth, Fortieth, Fiftieth	Class II—First, Fifth, Tenth, Twentieth on blue background Class III (Black print) on Fifth wash Class III (Yellow print) on Fifth wash	Class I—to Twentieth wash Class II—after Thirtieth wash	Class I	Class I—to Tenth wash Class II—after Tenth wash
B. Light	Class III—Poor	Class IV—Background, 40 hours Class II—Black Class I—Yellow	Class II—Fair	Class I—Good	Class I—Good
C. Crocking					
(1) Dry	Class I—Good	Class I—Good	Class I—Good	Class I—Good	Class I—Good
(2) Wet	Class I—Good	Class I—Good	Class I—Good	Class I—Good	Class I—Good
D. Perspiration					
(1) Acid	Class I—Good	Class I—Good	Class I—Good	Class II—Fair	Class I—Good
(2) Alkaline	Class I—Good	Class I—Good	Class I—Good	Class II—Fair	Class I—Good
E. Pressing					
(1) Dry	Class I—Good	Class I—Good	Class I—Good	Class I—Good	Class I—Good
(2) Wet	Class I—Good	Class I—Good	Class I—Good	Class I—Good	Class I—Good
Shrinkage CS 59-41					
(a) Warp	1.3% stretch	1.0% shrinkage	3.4% shrinkage	1.7% shrinkage	1.4% shrinkage
(b) Filling	1.0% shrinkage	4.4% shrinkage	1.0% shrinkage	0.0% shrinkage	7.0% shrinkage
Dimensional Restorability					
(a) Warp	7.0% restored to 4%	13.0% restored to 3% shrinkage	7.9% shrinkage restored to 4.2% shrinkage	0.4% shrinkage	.....
(b) Filling	6.0% restored to 2%	3.0% restored to 2% shrinkage	2.4% shrinkage restored to 0.0%	0.0% shrinkage	.....

a 0.2 per cent solution of neutral soap in 19 liters of Zeolite softened water at 37.7°±1°C. Water was then partially removed by one two-minute rinse in clear water at 37.7°±1°C. and a second two-minute rinse at 26°C., with gentle squeezing between the rinses and after the second rinse the fabric was then rolled in a towel to remove moisture.

Method II was identical with Method I throughout except that water was wrung by hand from the fabric with a torsion pressure of 0.36 ± 0.08 foot pounds after the sudsing and after each rinse.

The diagram which appears on page 441 represents the two respective methods.

PRESENTATION OF DATA

The findings of the study are presented in a series of graphs as follows:

Figure I shows the curves obtained by plotting the dry warp breaking strengths, pounds per thread, of an air-dried sample of Fabric I treated by Laundry Method I and Laundry Method II

Figure II shows the curves obtained by plotting the wet warp breaking strengths, pounds per thread, of an air-dried sample of Fabric I treated by Laundry Method I and Laundry Method II.

Figure III shows the curves obtained by plotting the dry filling breaking strengths, pounds per thread, of an air-dried sample of Fabric I treated by Laundry Method I and Laundry Method II.

Figure IV shows the curves obtained by plotting the wet filling breaking strengths, pounds per thread, of an air-dried sample of Fabric I treated by Laundry Method I and Laundry Method II.

Figure V shows the curves obtained by plotting the dry warp breaking strengths, pounds per thread, of an ironed sample of Fabric I treated by Laundry Method I and Laundry Method II.

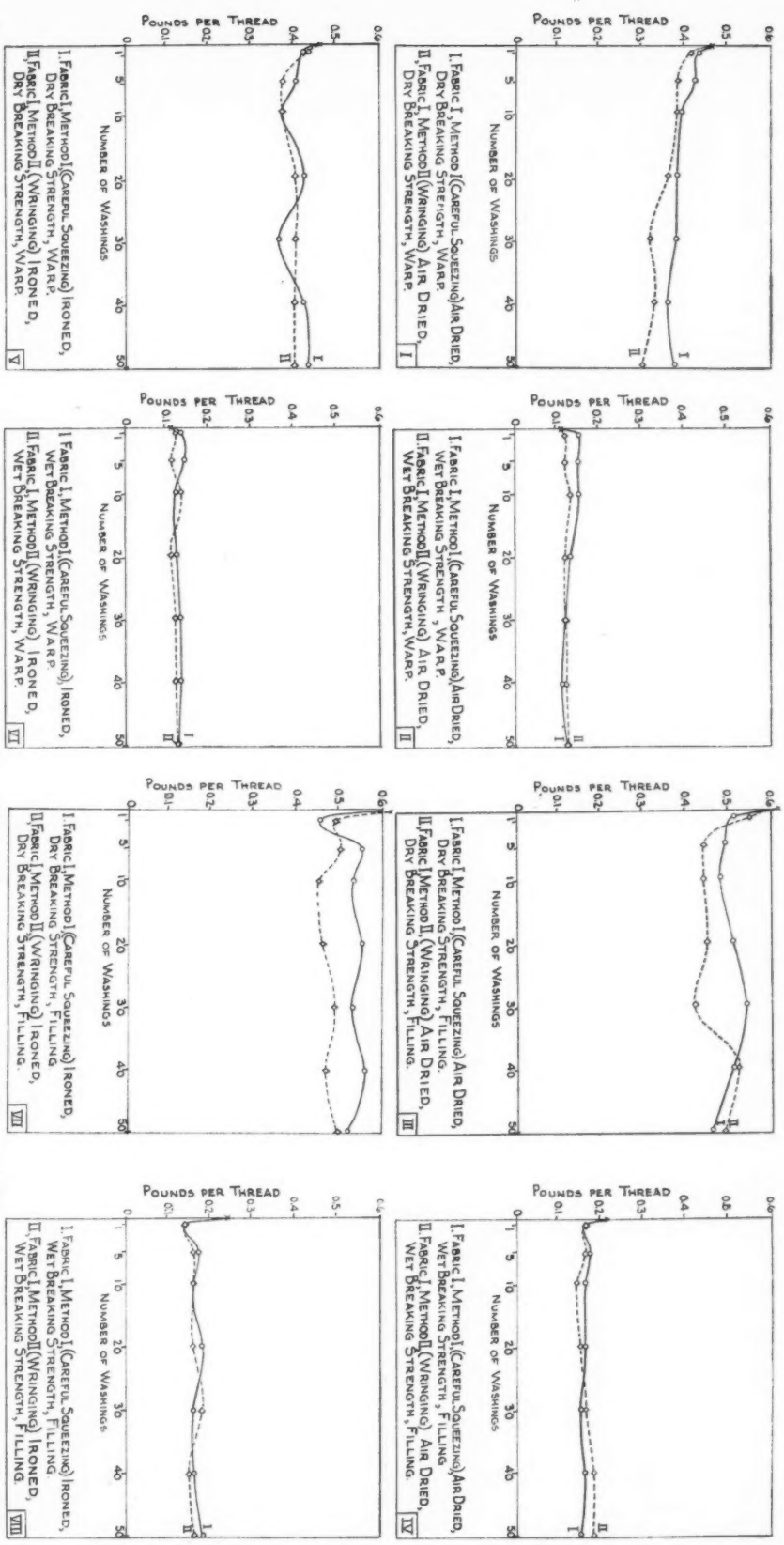
Figure VI shows the curves obtained by plotting the wet warp breaking strengths, pounds per thread, of an ironed sample of Fabric I treated by Laundry Method I and Laundry Method II.

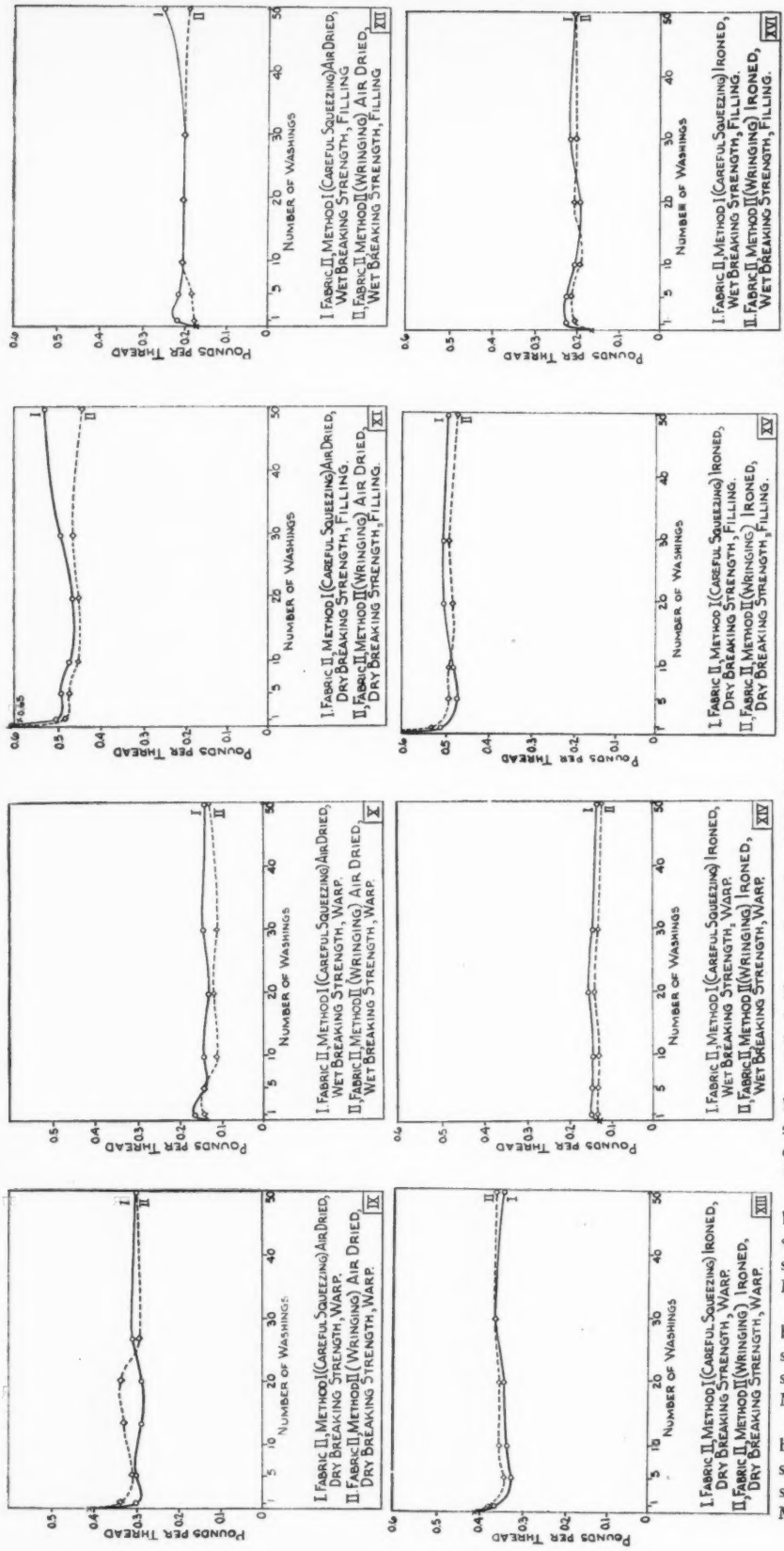
Figure VII shows the curves obtained by plotting the dry filling breaking strengths, pounds per thread, of an ironed sample of Fabric I treated by Laundry Method I and Laundry Method II.

Figure VIII shows the curves obtained by plotting the wet filling breaking strengths, pounds per thread of an ironed sample of Fabric I treated by Laundry Method I and Laundry Method II.

Figure IX shows the curves obtained by plotting the dry warp breaking strengths, pounds per thread, of an air dried sample of Fabric II treated by Laundry Method I and Laundry Method II.

Figure X shows the curves obtained by plotting the wet warp breaking strength, pounds per thread, of an air-





dried sample of Fabric II treated by Laundry Method I and Laundry Method II.

Figure XI shows the curves obtained by plotting the dry filling breaking strengths, pounds per thread, of an air-dried sample of Fabric II treated by Laundry Method I and Laundry Method II.

Figure XII shows the curves obtained by plotting the wet filling breaking strengths, pounds per thread, of an air-dried sample of Fabric II treated by Laundry Method I and Laundry Method II.

Figure XIII shows the curves obtained by plotting the dry warp breaking strengths, pounds per thread, of an ironed sample of Fabric II treated by Laundry Method I and Laundry Method II.

Figure XIV shows the curves obtained by plotting the wet warp breaking strengths, pounds per thread, of an ironed sample of Fabric II treated by Laundry Method I and Laundry Method II.

Figure XV shows the curves obtained by plotting the dry filling breaking strengths, pounds per thread, of an ironed sample of Fabric II treated by Laundry Method I and Laundry Method II.

Figure XVI shows the curves obtained by plotting the wet filling breaking strengths, pounds per thread, of an ironed sample of Fabric II treated by Laundry Method I and Laundry Method II.

Figure XVII shows the curves obtained by plotting the dry warp breaking strengths, pounds per thread, of an air-dried sample of Fabric III treated by Laundry Method I and Laundry Method II.

Figure XVIII shows the curves obtained by plotting the wet warp breaking strengths, pounds per thread, of an air-dried sample of Fabric III treated by Laundry Method I and Laundry Method II.

Figure XIX shows the curves obtained by plotting the dry filling breaking strengths, pounds per thread, of an air-dried sample of Fabric III treated by Laundry Method I and Laundry Method II.

Figure XX shows the curves obtained by plotting the wet filling breaking strengths, pounds per thread, of an air-dried Sample of Fabric III treated by Laundry Method I and Laundry Method II.

Figure XXI shows the curves obtained by plotting the dry warp breaking strengths, pounds per thread, of an ironed sample of Fabric III treated by Laundry Method I and Laundry Method II.

Figure XXII shows the curves obtained by plotting the wet warp breaking strengths, pounds per thread, of an ironed sample of Fabric III treated by Laundry Method I and Laundry Method II.

Figure XXIII shows the curves obtained by plotting the dry filling breaking strengths, pounds per thread, of an ironed sample of Fabric III treated by Laundry Method I and Laundry Method II.

(Continued on Page 455)

PROCEEDINGS OF THE

American Association of Textile Chemists and Colorists

OCTOBER 23, 1944

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Members should notify the Secretary immediately of all address changes.

ANNUAL MEETING A HUGE SUCCESS

THE Annual Meeting held in Atlantic City on October 12th, 13th and 14th, under the auspices of the Philadelphia Section, proved to be one of the most valuable, from a technical point of view, of any that the association has conducted. There were approximately 1,200 registrations.

All of the technical sessions were filled to overflowing and considerable interest was shown in the exhibits arranged by the armed services and also the patent exhibit arranged by the Alien Property Custodian.

The Philadelphia Section is to be congratulated on the excellent comprehensive printed program which they furnished. This contained all pertinent information regarding the arrangements for the meeting, as well as biographical sketches of the speakers and abstracts of the papers to be presented.

Another new feature of this meeting was the Personnel Service whereby employee and employer could meet on common ground.

The meeting came to a close on Saturday evening with the holding of the annual banquet at which Boyce C. Bond, chairman of the Philadelphia Section, presided. P. J. Wood was toastmaster and speakers included a representative of the Mayor of Atlantic City and Senator Albert W. Hawkes. The main address of the evening was made by Brig. Gen. W. C. Kabrich, Chief of the Technical Division of the Chemical Warfare Service at Edgewood Arsenal. There followed the announcement of the winners of the Intersectional Contest by Kenneth H. Barnard, Chairman. They were as follows:

1st—Rhode Island Section.

2nd—Northern New England Section.

3rd—New York Section.

There followed the first award of the Olney Medal to Dr. Louis A. Olney, for whom the medal was named. The medallist was eulogized by Dr. R. E. Rose and the presentation was made by A. P. Howes. The medallist reviewed the accomplishments which have been made in the field of textile chemistry and dyeing since the time when he first became identified with the field.

The above represents merely a sketchy outline of the meeting which was arranged under the general chairmanship of Charles A. Seibert, whose committees are to be complimented upon the amount of time, effort and thought that was spent in preparing the meeting.

Complete reports of papers presented, meetings held, and the banquet proceedings will be published in future issues, together with a number of photos.

There follows a number of abstracts of papers presented during the Intersectional Contest. Abstracts of the other papers will be published if received in time, before the complete papers appear in the December 4th issue:

"Factors Affecting Color Yield in Vat Color Printing"

Presented by the Rhode Island Section

Much empirical knowledge exists regarding the factors which affect color yield in vat color printing. Previously published studies have pointed out that color yield is definitely affected by various properties of the paste including viscosity, total solids content, and the nature of the thickener.

While it is generally known that the type of thickener used in a print paste has great influence on the color yield, there is very little specific knowledge as to just what properties of the thickeners cause these variations. This study was undertaken in an effort to determine the characteristics of thickeners which cause variations in color yield. To investigate the principles underlying thickener action, prints were made using conventional thickeners, together with other substances chosen to demonstrate specific effects. The techniques of micro-photography, spectrophotometry, and visual observation were used to study both printing pastes and printed fabrics.

As a result of these studies, it was demonstrated that the following four characteristics of the thickener materially affect color yield:

1. Effect on dispersion of the vat color pigment in the paste.
2. Effect on penetration of the printing paste into the fabric.
3. Protective colloid action.
4. Effect of amount of print paste delivered to the fabric.

"Starch Fluidities"

Presented by Piedmont Section

There is an emphatic need for a standardization of procedure and nomenclature with reference to starch fluidity. Practically all starches are sold to the textile trade on a fluidity basis, yet the figures employed by the various starch manufacturers are meaningless unless the mill is familiar with the method used to arrive at a fluidity for a particular starch.

The purpose of this study is a compilation of methods for fluidity determinations as used by major starch producers, the selection of three of those methods and the testing of several different starches marketed under the same fluidity number according to the aforementioned procedures. Fluidity results from different laboratories using the same starches and procedures, including figures from different operators in the same laboratory, are compared. It was found that no two starch producers used similar procedures. Starches purported to have the same fluidities vary widely when their fluidities are determined by the same method. A specific starch may or may not have the same fluidity as another starch marketed at a similar fluidity, depending on the method or methods employed.

The conclusion is drawn that current methods employed for the determination of starch fluidities are meaningless and wholly inadequate for the needs of the textile mill.

"Cotton Knitting Yarn: Factors Influencing Its Knittability"

Presented by the South Central Section

The essential requirement of a good knitting yarn is lubricity. Two principal factors are involved: fiber to fiber lubricity and fiber to metal lubricity. The former relates to the smooth slippage of fiber over fiber (or yarn over yarn) and when present the condition commonly known as "softness" results. There is no common term to describe the latter, which can be briefly described, in a rather negative fashion, as the absence of friction between fiber (or yarn) and metal. For this factor the designation "yarn-metal lubricity" was evolved.

It was found that the variation in width of a ribbed fabric knit under controlled conditions could be taken as a measure of "softness" of cotton yarns, using a good combed cotton yarn as a standard. The degree of yarn-metal lubricity was not measured but the fact that a yarn had that particular lubricity could be determined by how well it knit on the knitter.

A good cotton yarn inherently possesses good knitting qualities. It is possible to maintain and even enhance this condition by physical and/or chemical means. A sidelight developed in the study of cotton knitting yarns was the superior adaptability of mercerized yarns to processing. These conclusions are based on extensive experimental work and a number of tables and diagrams are used to outline what was done.

"Effect on the Appearance of Hosiery Made from Viscose, Bemberg and Acetate Yarns Subjected to Variations in Tension and Steaming During Throwing"

Presented by the Philadelphia Section

The preparation of rayon yarns suitable for making first quality ladies hosiery presents a host of problems among which are their behavior under tension and during steaming.

Stress-strain curves of viscose, Bemberg, and acetate yarns show that they are relatively inelastic and under certain conditions very sensitive to tension. Dirty and warn yarn guides and tension devices, poorly formed spools and packages, and improperly conditioned yarn are all factors which may lead to local excessive elongations in a yarn. Such stretched portions of a yarn relax when the fabric made from the yarn is scoured and dyed giving a "tiger-stripe" effect or a general non-uniformity of stitch formation. This effect is not noticeable with viscose yarn.

Steaming also relaxes any stretched portions of the yarn except on Bemberg yarn which it only partially relaxes. Thus the throwster can use steaming to remove any irregularities that were unavoidably introduced prior to this operation. Steaming itself, however, reduces the affinity of all rayon yarns for the customary dyestuffs. This effect increases with higher temperatures and longer times. To insure uniform yarn in a lot, all batches steamed should be controlled carefully as to temperature and time.

"Some Tendering and Non-tendering Influences Commonly Present in Sulfur Dyeing"

Presented by the Southeastern Section

This paper covers certain specific causes for tendering of sulfur-dyed cotton, and also points out other influences that are harmless.

Probably the most noteworthy of the findings was the disclosure that present day sulfur dyestuffs contain iron as an impurity in amounts ranging up to 1 per cent, and the presence of this iron seems to accelerate decomposition of the dye with resultant tendering of the dyed goods. In an experiment to demonstrate this, the iron was removed from a commercial sulfur black dyestuff and it was found that cotton dyed with this iron-free dye had more resistance to tendering than similar goods dyed with the commercial product.

A further study into the effect of impurities shows that small amounts of free sulfur present in cotton after dyeing will not cause tendering. Organic materials present in the dyestuff itself such as the intermediates paranitro-phenol, dinitro-phenol, or trinitro-phenol, in aggregates of 1 per cent or less produced no damage.

Employing soda ash or sodium acetate in the final rinse of dyed material was found to be a definite aid in preventing later tendering of these goods.

FALL MEETING, MID-WEST SECTION

THE Fall Meeting of the Mid-West Section will be held at the Bismarck Hotel, Chicago, on November 4, 1944.

The afternoon session will start at 2 P.M. with an "Information Forum." The panel of experts will be N. G. Koehler, Herman Boxser, A. G. Roy, and W. E. Brainerd. Members are requested to send questions to the Secretary of the Section before the meeting. Following the forum, John O'Day of Nyanza Color & Chemical Co., will speak on "The Dyeing of Pulled Wool."

Dinner will be served at 7 P.M. to be followed by the regular business meeting. The evening speaker will be W. L. Friend of International Nickel Co. on the subject "Some Notes on Corrosion Resisting Materials in Dye House Equipment."

MEMBERSHIP APPLICATIONS

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J. William Lipp—Asst. Research Chemist, Fred Whitaker Co., Philadelphia, Pa. Sponsors: C. Altenbaumer, A. E. Raimo.

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Dorothy Nickerson—Color Technologist, U. S. Dept. of Agriculture, Washington, D. C. Sponsors: W. D. Appel, H. C. Chapin.

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William Tilley Green—Specialist in Artificial Leather & Lacquers, The Glidden Co., Reading, Pa.

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Atlas Electric Devices Co.
Banco, Inc.
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Burlington Mills Corp.
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Traub, Lyons, Oppenheim, Inc.
Tryon Processing Co.
Uxbridge Worsted Co.
Wannalancit Textile Co.
Waldrich Co.

CALENDAR OF COMING EVENTS

Meeting, Rhode Island Section, Providence Engineering Society, 195 Angell Street, Providence, R. I., October 27, 1944. Speakers: Alden Nute: "The Shrinkage Control of Wool"; Raymond W. Jacoby: "Factors Affecting Color Yield in Vat Color Printing" (Paper presented by Rhode Island Section in Intersectional Contest).

Annual Meeting, Piedmont Section, Hotel Charlotte, Charlotte, N. C., November 3, 1944. R. W. Armstrong, President of the Union Bleachery, Greenville, S. C., will be the banquet speaker.

Fall Meeting, Mid-West Section, Bismarck Hotel, Chicago, Ill., November 4, 1944. Afternoon session, 2 P.M., "Information Forum"; John O'Day, Nyanza Color & Chemical Co., "The Dyeing of Pulled Wool." Dinner—7 P.M.; Evening speaker, W. L. Friend, International Nickel Co., "Some Notes on Corrosion Resisting Materials in Dye House Equipment."

Meeting, New York Section, November 17. Symposium on "Recent Developments in Synthetic Fibers and their Uses in Fabrics."

Meeting, Philadelphia Section, November 17, 1944.

Meeting, Northern New England Section, November 17, 1944.

Meeting, Southeastern Section, Atlanta Athletic Club, Atlanta, Ga., November 25, 1944.

Study of a
SOIL-BURIAL METHOD
for Determining Rot Resistance of Fabrics

D. M. BATSON, DOROTHEA J. TEUNISSON AND N. PORGES

Southern Regional Research Laboratory,[1] New Orleans, Louisiana

(Concluded from last issue)

EXPERIMENTAL RESULTS

Zone of Maximum Rotting

Examinations of untreated cotton and jute specimens removed from the outdoor bed indicated that microbial infection and attack had been remarkably uniform throughout the buried portion of each specimen. Breaking strength tests made on the previously described "upper" and "lower" sections of such specimens showed that the average daily loss in breaking strength was approximately the same in each section, and was about equal in specimens from Soil C and Soil N. It was noted, however, that the strips broke most frequently in the lower part of the upper section and in the upper part of the lower section, and that no breaks occurred within the unburied one-half-inch portion of the upper section. The daily frequency-distribution of breaks within the two sections, expressed as number of breaks per one-inch zone of specimen is shown in Table I. These successive one-inch zones correspond to soil depths, and the zones of maximum breaking frequency indicate the soil depths at which maximum fabric rotting occurred.

The data show that during the first three or four days of the burial period, before rotting became severe, the strips broke at scattered points within the two sections tested. After rotting of the strips became more pronounced, however, the highest proportion of breaks, and thus the greatest rate of fabric rotting, in the two sections occurred within the three one-inch zones lying between 1 and 4 inches below the soil surface. Earlier, Waksman (15) found that in a humid-region soil microorganisms were most numerous at similar depths. Little rotting of the unburied portion of the strips was noted, and rotting seemed to have been somewhat retarded in the upper 1-inch zone of the buried portion. This may have been due to the sterilizing and drying action of sunlight on both the exposed fabrics and the surface soil, and also to the daily fluctuations in temperature, which are more severe at the soil surface than at greater depths in the soil. Some of the data in Table I are presented graphically in Figure I.

It was noted that specimens rotted 1 to 2 days sooner when buried in the recommended way than did similar specimens which were buried without pressing the soil into close contact with them. It was also found that specimens which were moistened with water or nutrient solution prior to burial did not rot any more rapidly than those buried while dry.

Breaking Strength Losses

The percent loss in breaking strength of untreated cotton osnaburg and jute burlap fabrics after burial in Soil C and Soil N for different numbers of days is shown in Table II. Each recorded value represents the average percent loss of five similar individual fabric strips. For each set of fabrics, breaking strength measurements were made on strips removed from the soil on successive days until the strips were completely rotted. New sets of fabrics were buried consecutively as necessary at six to eight-day intervals over a period of four months. Therefore, the values given are a day by day measure of the rotting power of Soil C and Soil N with respect to untreated cotton and jute fabrics.

The data show that, in all of the different sets of untreated fabrics, both cotton and jute specimens were almost completely rotted after six to eight days burial. In most of the sets the cotton fabric strips had lost up to 100 per cent of their breaking strength by the sixth or seventh day after burial, while the jute strips retained a very small percentage of their breaking strength for one or two days longer. The differences between these breaking strength values for the two types of fabrics are slight, however, and for practical purposes it may be considered that the cotton and jute fabrics rotted at the same rate. Also, as will be noted, each of the respective sets of specimens rotted in approximately the same number of days. The latter indicates that the microbiological activity of the soils did not fluctuate greatly between different periods during the experiment, which is evidence that the experimental procedure in use allowed reasonably good control over the factors influencing fabric rotting.

The breaking strength data for the

Table I. Frequency distribution of tension-induced breaks in buried strips of untreated fabrics.

Type of fabric	*Depth of zone from soil surface*	*Number of breaks on indicated days after burial*							*Total number of breaks*	*Number of breaks during last four days of burial period*
	(inches)	*2 days*	*3 days*	*4 days*	*5 days*	*6 days*	*7 days*	*8 days*		
Cotton Osnaburg	0-1	5	5	4	2	0	0	..	16	6
Cotton Osnaburg	1-2	2	3	4	3	3	3	..	18	13
Cotton Osnaburg	2-3	5	2	5	5	7	9	..	33	26
Cotton Osnaburg	3-4	2	6	3	6	7	7	..	31	23
Cotton Osnaburg	4-5	5	4	4	2	3	1	..	19	10
Cotton Osnaburg	5-5½	1	0	0	2	0	0	..	3	2
Jute Burlap	0-1	6	6	3	3	7	1	2	28	13
Jute Burlap	1-2	4	4	5	3	3	8	7	34	21
Jute Burlap	2-3	1	2	4	5	4	4	7	27	20
Jute Burlap	3-4	8	4	5	4	3	6	3	33	16
Jute Burlap	4-5	1	4	2	3	3	1	1	15	8
Jute Burlap	5-5½	0	0	1	2	0	0	0	3	2

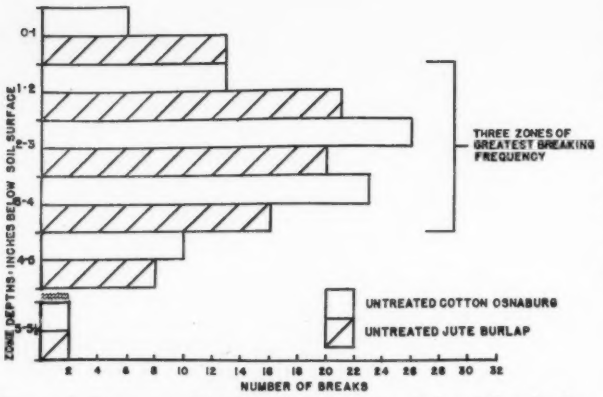

Figure I. Frequency Distribution of Tension-induced Breaks Occurring in Fabric Strips During last Four Days of Burial Period.

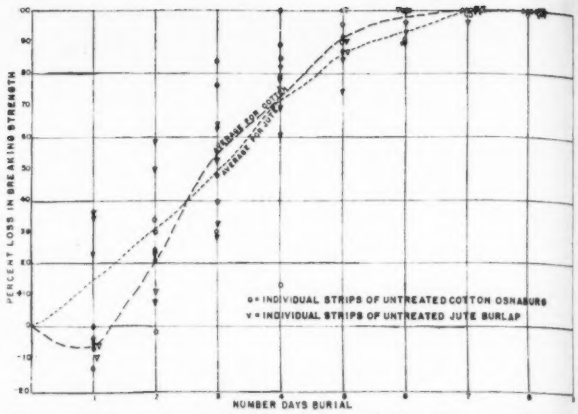
PERCENT LOSS IN BREAKING STRENGTH
o = INDIVIDUAL STRIPS OF UNTREATED COTTON OSNABURG
v = INDIVIDUAL STRIPS OF UNTREATED JUTE BURLAP
NUMBER DAYS BURIAL

Figure II. Variation in Breaking Strength Loss Between Replicate Strips of Untreated Cotton and Jute Fabrics.

Table II. Losses in breaking strength shown by consecutively buried replicate sets of untreated cotton and jute fabrics.

PER CENT LOSS IN BREAKING STRENGTH

SOIL	FABRIC	Number of days burial 2	3	4	5	6	7	8	Number of days burial 2	3	4	5	6	7	8	Number of days burial 2	3	4	5	6	7	8
N[a]	Cotton				Set No. 1							Set No. 2							Set No. 3			
	Osnaburg.	28	58	74	92	95	100	100	26	61	78	100	100	100	100	15	65	83	94	100	100	100
C[b]	Cotton																					
	Osnaburg.	30	61	82	94	100	100	100	19	54	77	97	100	100	100	27	69	90	98	100	100	100
N	Jute Burlap	2	39	75	85	93	97	99	18	58	75	90	95	97	99	29	63	83	96	98	99	100
C	Jute Burlap	33	66	80	89	93	96	99	24	59	79	84	89	95	99	27	57	76	89	94	99	100
N	Cotton				Set No. 4							Set No. 5							Set No. 6			
	Osnaburg.	27	55	79	96	98	100	100	19	49	67	81	..	100	100	38	56	79	100	100	100	100
C	Cotton																					
	Osnaburg.	21	55	67	92	98	100	100	27	45	69	90	..	100	100	32	66	80	94	94	100	100
N	Jute Burlap	20	46	76	86	92	100	100	31	46	62	70	..	98	100	30	44	81	87	94	96	100
C	Jute Burlap	30	48	73	87	93	99	100	34	48	67	76	..	97	100	31	64	76	89	95	98	100
N	Cotton				Set No. 7							Set No. 8							Set No. 9			
	Osnaburg.	34	53	58	83	93	100	100	..	69	98	98	100	100	100	19	61	91	100	100	100	100
C	Cotton																					
	Osnaburg.	20	57	67	85	93	100	100	..	72	89	96	95	100	100	25	67	87	93	100	100	100
N	Jute Burlap	22	40	63	87	90	98	100	..	57	88	95	99	100	100	28	72	80	96	100	100	100
C	Jute Burlap	26	21	51	76	85	93	98	..	66	83	85	100	100	100	36	61	77	86	98	100	100
N	Cotton				Set No. 10							Set No. 11							Set No. 12			
	Osnaburg.	34	62	79	98	100	100	100	35	72	80	95	95	100	100	54	71	86	92	100	98	100
C	Cotton																					
	Osnaburg.	32	70	85	100	100	100	100	38	65	69	86	90	100	100	48	70	82	90	95	100	100
N	Jute Burlap	35	66	83	96	95	99	100	38	66	81	85	95	98	100	49	69	81	91	95	98	100
C	Jute Burlap	35	69	73	93	96	98	100	29	67	78	84	89	97	100	41	66	81	86	93	96	98
N	Cotton				Set No. 13							Set No. 14							Set No. 15			
	Osnaburg.	19	55	85	87	98	100	100	24	54	77	96	98	100	100	19	51	81	94	98	100	100
C	Cotton																					
	Osnaburg.	16	58	76	93	98	100	100	39	56	75	89	95	100	100	5	59	81	92	97	98	100
N	Jute Burlap	29	57	75	83	92	100	100	35	56	78	83	96	96	100	27	62	84	92	98	99	100
C	Jute Burlap	25	56	69	81	89	91	100	31	56	73	82	87	84	100	16	39	73	85	97	96	100
N	Cotton				Set No. 16							Set No. 17										
	Osnaburg..	37	62	84	85	97	100	100	27	60	..	87	90	100	100							
C	Cotton																					
	Osnaburg.	40	58	84	88	94	98	100	29	57	..	86	90	97	100							
N	Jute Burlap	49	75	85	91	92	95	100	29	63	..	90	96	100	100							
C	Jute Burlap	44	66	81	83	93	97	100	28	65	..	84	90	89	100							

[a] Soil N was moistened with nutrient solution.

[b] Soil C was moistened with distilled water.

specimens which were buried in Soil N and those buried in Soil C are in close agreement. Therefore, since the addition of nutrients to Soil N did not markedly affect the rate of fabric rotting it follows that the nutrient content of Soil C with respect to the nutrients considered was at all times adequate for the microorganisms participating in the rotting of cellulose fabrics.

Each value presented in Table II represents the average per cent loss in breaking strength for one group of five strips of fabric on the indicated day after a given set of fabrics was buried. However, the individual strips within a group ordinarily differ widely in breaking strength. A typical example of the breaking strength differences between replicate strips of buried untreated fabrics is given in Figure II, where the percent loss in breaking strength of each strip of cotton and jute fabric from Set No. 4 is plotted against number of days burial. The magnitude of

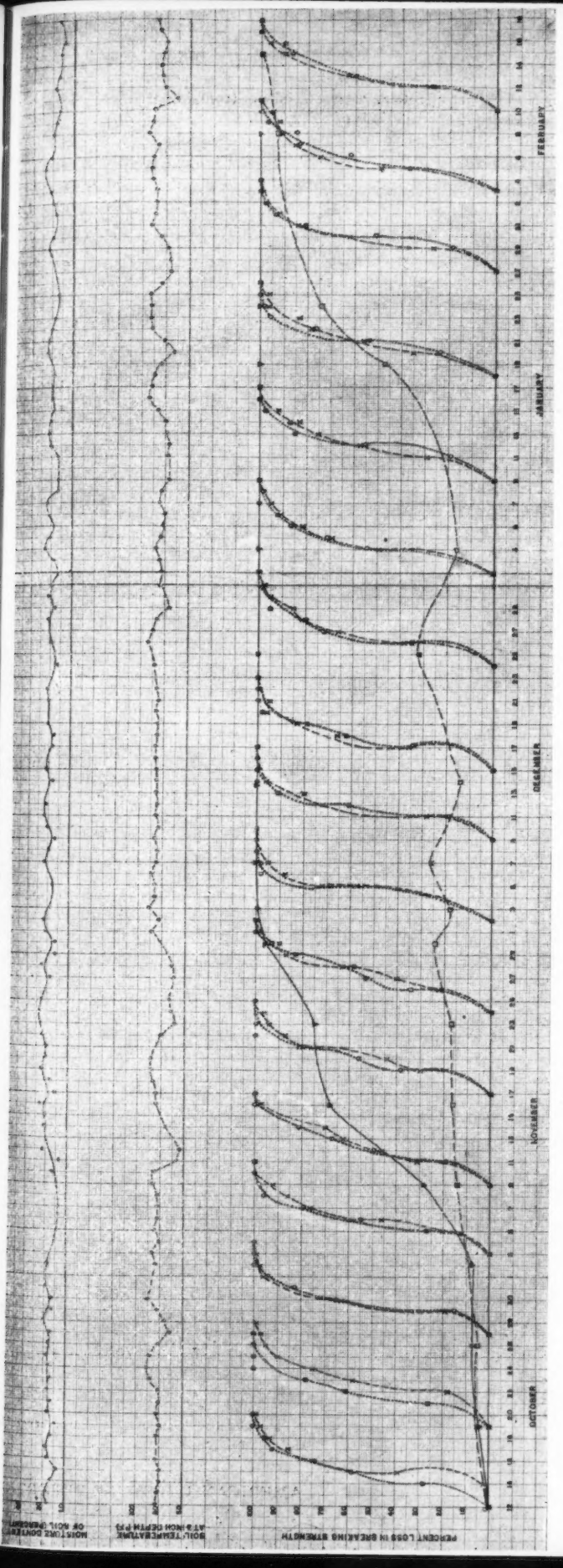

Figure III. Breaking Strength Losses by Cotton Osnaburg and Jute Burlap Fabrics During Burial in Nutrient-treated Soil (Soil N), and Daily Recordings of Soil Temperature and Soil Moisture.

LEGEND:

o ——— o Cotton Osnaburg, untreated
x ——— x Jute Burlap, untreated
▼ ——— ▼ Cotton Osnaburg, copper naphthenate-treated
□ ——— □ Jute Burlap, copper naphthenate-treated

these differences is shown by the spread between the plotted individual values, and the daily average of the values is indicated by the curves.

It will be noted that the cotton fabric increased slightly in strength just after burial. (The zero point on the ordinate in Figure II represents the average breaking strength of 25 original raveled strips of each type of fabric). The jute specimens, in contrast to cotton, showed a marked loss in breaking strength after burial for only one day. Since it is unlikely that rotting processes were solely responsible for the rapid loss in strength which occurred during the first day of burial, the loss probably was partially due to the action of adsorbed moisture in causing an irreversible decrease in cohesion between the jute fibers. It will also be noted in Figure II that, in most cases, the spread between the plotted points for both cotton and jute fabrics became successively smaller as the duration of burial increased. This trend, however, does not indicate a corresponding decrease in relative variation between the breaking strength losses of the individual members of a group of strips. The trend is chiefly explained by the fact that as the buried strips lose strength the ratio of their breaking strength to that of respective original fabrics likewise decreases. For example, assuming that the average breaking strength of the original raveled strips of cotton fabric was 50 lbs., then, if after removal of a group of five buried strips, the strongest, or least-rotted, strip showed a breaking strength of 40 lbs. and the weakest 20 lbs., the spread between the plotted values for percent loss in breaking strength would be much greater than if these breaking strengths had been 4 lbs. and 2 lbs., respectively.

At the beginning of the experiment, rotproofed fabric specimens were buried along with the first set of untreated fabrics. The results obtained with the principal rotproofed fabrics, namely, copper napthenate-treated cotton osnaburg and jute burlap containing one per cent by weight of copper, are given in Table III.

The treated cotton fabric showed little loss in breaking strength during the first 21 days of burial in Soil C or Soil N, but afterwards lost strength rapidly until completely rotted. The treated cotton strips in Soil N rotted somewhat faster than those in Soil C, indicating that the addition of nutrients slightly accelerated the rate of rotting of the treated cotton. The treated jute strips were almost completely resistant to attack for about three weeks, then rotted slowly for six weeks longer, and afterwards rotted at a much greater rate. The addition of nutrients to Soil N had no appreciable effect on the rotting of the treated jute.

Table III. Per cent loss in breaking strength of copper naphthenate-treated fabrics (containing one per cent copper by weight) after different periods of soil burial.

Type of fabric	*Soil*	*Per cent loss in breaking strength*															
		Number of days burial															
		7	*14*	*21*	*28*	*35*	*42*	*49*	*52*	*56*	*63*	*74*	*83*	*99*	*104*	*119*	*126*
Cotton Osnaburg	N	4	7	7	28	68	74	95	99	100	100	100	100	100	100	100	100
Cotton Osnaburg	C	4	10	10	28	44	60	80	94	81	100	100	100	100	100	100	100
Jute Burlap	N	5	5	8	14	16	17	24	18	26	14	32	16	47	74	94	100
Jute Burlap	C	0	5	4	20	18	19	22	25	26	24	41	52	58	70	96	100

In several instances the values given in Table III for percent loss in breaking strength show irregular decreases, instead of constant increases, with increasing number of days burial. This anomaly, which is especially evident in the case of the treated jute fabrics, is believed to be due chiefly to errors in sampling. Each value represents the average breaking strength loss of only five fabric strips and it is difficult to obtain a sample of this size which will be entirely representative of the total number of similar fabric specimens under test. Such irregularities are here more pronounced than for the untreated fabrics, since differences between individual specimens in the uniformity of deposition of the rot-proofing agent would cause the treated specimens to differ in rot resistance.

The average per cent loss in breaking strength shown by both untreated and copper napthenate-treated cotton and jute fabrics buried in Soil N is presented graphically in Figure III. The curves showing the rates of rotting of these fabrics were plotted from the data given in Table II and Table III. Since the breaking strength data in these tables are quite similar for fabrics from Soil N and Soil C, curves are given for fabrics from Soil N only. In addition, curves representing the moisture content and the temperature of the soil are shown.

The copper napthenate-treated cotton osnaburg did not rot completely until about the fiftieth day after burial, while during this same period seven sets of untreated osnaburg and untreated jute burlap had rotted completely. On the other hand, the copper napthenate-treated jute was not entirely rotted until 126 days after burial, or until seventeen successively buried sets of untreated fabrics had rotted. Similar results with treated cotton and jute have been obtained in other tests, but the reason for the rot-resistance of copper napthenate-treated jute being higher than that of similarly treated cotton is not definitely known. This difference in rot resistance between jute and cotton fabrics containing the same percentage of copper by weight cannot be accounted for solely on the basis of the weight of fabric per unit area being greater for jute than for cotton. It is well known, however, that jute fibers are much coarser than cotton fibers; therefore, the surface area of fibers per unit weight of copper present would be less in the case of jute. Accordingly, this would mean a higher concentration of copper per unit of fiber surface in jute than in cotton, which might partially explain the relatively greater rot resistance of the treated jute fabrics. Although the burial tests showed that untreated jute rotted at practically the same rate as untreated cotton, which is in agreement with the observation of Thaysen *et al.* (12), the lignin content of jute should here be considered. It may be that when jute is treated with copper naphthenate a complex lignin-copper naphthenate or lignin-copper compound is formed in and on the jute fibers, and that such a compound imparts greater rot-resistance than does copper naphthenate alone.

Soil Temperature and Soil Moisture

The temperature of the soil at a depth of 3 inches was in every case measured in early morning before the surface soil was warmed by the sun, and the values shown by the soil temperature curve in Figure III represent approximately the minimum temperatures reached at this soil depth. If the soil-temperature curve is compared with the rotting curves for the various sets of untreated fabrics it will be noted that no appreciable retardation of fabric rotting was caused by either the decreases in soil temperature which occurred during short periods of cool weather or by the increases in soil temperature during warm weather. It appears, therefore, that the observed deviations in soil temperature from the 85° F. level which was considered to be the optimum, were either too slight or too short in duration to markedly change the rate of fabric rotting. The soil temperature fluctuations at the 3-inch depth were less than at the soil surface where cooling at night and warming by sunlight caused temperature fluctuations to be greatest.

An attempt was made to maintain the soil at a moisture content of approximately 28 per cent, which was considered to be the optimum moisture level for the soil used. In Figure III the curve representing soil moisture shows that the soil moisture content did not vary greatly. Since the variations which did occur are not reflected in the rotting curves of the untreated fabrics, it may be concluded that the moisture content of the soil was at all times maintained sufficiently near the optimum level to favor rapid rotting of fabrics.

Soil Composition

The mechanical composition of the soil used in the burial tests is shown in Table IV. The high proportion of sand in the soil insured good aeration and a high degree of permeability to water. Sufficient silt and clay was present to bind the sand particles so as to permit the development of good soil structure. The high content of organic matter was adequate to prevent excessive compaction of the soil. The silt, clay, and organic matter also had numerous other important functions, among which were the retention of soil moisture, buffering the soil against fluctuations in pH, holding nutrient cations in an exchangeable or replaceable form, and supplying chemical substances for the nutrition of soil microorganisms.

Table IV. Mechanical composition of soil used in the burial tests.

Mechanical separates	*Particle diameter range of separate (mm.)*	*Percentage by weight on oven-dry basis*
Sand	2.0 -0.05	72.4
Silt	0.05-0.005	7.8
Clay...less than	0.005	9.9
Organic matter[1].		9.9

[1] Estimated by loss on ignition.

Chemical analyses showed that both Soil C and Soil N contained a good supply of available nitrogen, phosphorus, and potash at all times. The amounts of these nutrients present in Soil C did not change greatly during the experiment, but in Soil N increased gradually with repeated additions of nutrient solutions. At the beginning of the experiment the average available nutrient content of Soil C, on the basis of oven dry weight of soil, was found to be as follows: nitrate nitrogen, 65 p.p.m. (parts per million); ammonia nitrogen, 5 p.p.m.; phosphorus, 170 p.p.m.; and potassium, 950 p.p.m.[3] Fifty days later the

[3] Includes both water-soluble and exchangeable potassium.

Table V. Average numbers of microorganisms present in Soil N and amount of carbon dioxide evolved by soil during the burial period of each set of untreated fabrics.

Table V. Average numbers of microorganisms present in Soil N and amount of carbon dioxide evolved by soil during the burial period of each set of untreated fabrics.

Type of microorganism	10/12/42 to 10/18/42	10/19/42 to 10/26/42	10/27/42 to 11/2/42	11/3/42 to 11/8/42	11/9/42 to 11/16/42	11/17/42 to 11/23/42	11/23/42 to 12/1/42	12/2/42 to 12/8/42	12/9/42 to 12/14/42	12/15/42 to 12/23/42	12/24/42 to 12/31/42	1/1/43 to 1/8/43	1/9/43 to 1/17/43	1/18/43 to 1/26/43	1/27/43 to 2/2/43	2/3/43 to 2/9/43	2/10/43 to 2/15/43
	Average numbers of microorganisms per gram of soil during indicated period (0000 omitted)																
Bacteria	1458	1535	3615	2350	2918	4480	3434	N.D.[3]	2797	4134	N.D.	4245	N.D.	5976	4829	4562	2917
Actinomycetes	31.8	17.3	13.9	10.9	11.9	16.4	14.9	N.D.	12.3	21.9	N.D.	19.8	N.D.	30.5	17.7	20.7	17.5
Fungi	7.3	3.8	9.0	2.3	3.6	3.6	1.7	N.D.	2.9	3.9	N.D.	3.1	N.D.	6.1	6.8	8.7	2.9
Aerobic cellulose decomposers	0.6	2.5	1.7	1.0	1.0	8.0	1.0	N.D.	7.0	1.0	N.D.	1.0	N.D.	1.0	5.5	0.06	1.0
	Average daily carbon dioxide evolution (expressed as milligrams of carbon per 100 grams of soil)																
Soil (control)	22	23	N.D.	16	15	15	22	N.D.	10	10	N.D.	9	N.D.	7	13	8	6
Soil plus added cellulose	34	38	N.D.	36	37	35	41	N.D.	17	15	N.D.	23	N.D.	38	29	29	29

[3] (Signifies "Not Determined")

available nutrient content of Soil C was practically unchanged, while for Soil N it was as follows: nitrate nitrogen, 120 p.p.m.; ammonia nitrogen, 15 p.p.m.; phosphorus, 260 p.p.m.; and potassium, 1400 p.p.m.[2] The carbon-nitrogen ratio of both Soil C and Soil N remained between 13:1 and 14:1 at all times.

At the beginning of the experiment the soil had a pH of 7.50. Later measurements made at frequent intervals showed that only slight changes in soil reaction occurred, the noted variations ranging from a minimum of pH 7.00 to a maximum of pH 7.70.

Soil Microorganisms

Plate counts were made on both Soil C and Soil N at 2 to 3-day intervals throughout the experiment. In Table V are given the averages of plate count determinations made on Soil N during the burial period of each set of untreated fabric specimens, and the results of concurrent determinations of the number of cellulose-decomposing microorganisms and of the carbon dioxide-evolving power of the soil.

The plate count data indicate that the microbial population of the soil fluctuated greatly. Such erratic data are characteristic of the results commonly obtained by plate count methods. In view of the results of the outdoor burial tests showing that the rate of rotting of untreated fabrics did not vary appreciably during the experiment, little significance can be attached to the indicated fluctuations in total microbial population. In a general way, however, the plate counts do show that the number of bacteria are of the order normally found by this method in a good fertile soil, while the number of fungi are lower than would be expected.

Other data given in Table V show that the numbers of aerobic cellulose-decomposing microorganisms varied from 6 to 80 thousand per gram of soil, and that marked increases in carbon dioxide evolution resulted from additions of cellulose to the soil. The effect of cellulose upon the amount of carbon dioxide evolved by the soil is illustrated in Figure IV.

[2] Includes both water-soluble and exchangeable potassium.

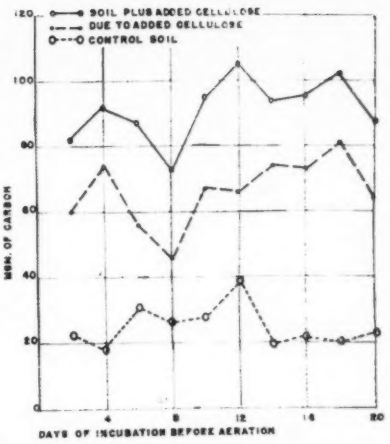

Figure IV. Carbon Dioxide Evolved per 48 Hours by 100 Grams of Soil with and without Added Cellulose.

Indoor Burial Tests

Specimens of untreated cotton osnaburg (6½ oz. per sq. yd.) were buried in different ways in an indoor bed. One series of tests was carried out with the soil at a temperature of 86 ± 2° F. and a second series with the soil temperature at 75 ± 5° F. The results obtained at these soil temperature levels with specimens buried horizontally at different depths are given in Table VI.

These data show that when the soil temperature was 86 ± 2° F., specimens buried horizontally at 1, 3, 5, and 7-inch depths lost their breaking strength at about the same rate, and all were completely rotted after 6 days burial. However, when the soil temperature was 75 ± 4° F., specimens buried at a depth of 1 inch required 8 days burial for complete rotting or two days longer than at the higher soil temperature, while the specimens buried at a depth of one-fourth inch lost only 86 per cent of their breaking strength in 8 days. Therefore, it may be concluded that the rate of rotting of the specimens was practically the same at soil depths of 1, 3, 5, and 7 inches, but less rapid at a depth of one-fourth inch than at 1 inch, and much slower at all depths when the lower soil temperature was maintained.

Table VI. The effect of soil temperature and depth of burial on the breaking strength of horizontally buried specimens of untreated cotton osnaburg.

Depth of burial	*Temperature of soil during burial*	*Per cent loss in breaking strength number days burial*			
		2	*4*	*6*	*8*
(Inches)					
¼	75 ± 4° F.	2	59	82	86
1	75 ± 4° F.	7	73	90	100
1	86 ± 2° F.	27	87	100	100
3	86 ± 2° F.	40	88	100	100
5	86 ± 2° F.	35	88	100	100
7	86 ± 2° F.	37	88	100	100

Careful visual comparisons of the vertically buried specimens were made. It was found that when the soil temperature was 86 ± 2° F. specimens which had been pushed down (with a metal blade) to depths of 3, 5, and 7 inches were badly disintegrated in the lower portions after 6 days burial, while the specimens buried in trenches, including both vertical and U-type burials, were just beginning to disintegrate uniformly in all buried portions. These burials were repeated at a soil temperature of 75 ± 4° F. and the same relative results were obtained between the respective types of burial. Here, however, as in the case of the horizontal specimens, 8 days burial at this soil temperature was required for the specimens to rot to the same extent as they did in 6 days at the higher soil temperature.

In addition to the foregoing observations, it was noted that the lower folded edges of the pushed-down specimens were no more severely rotted than adjacent portions of the fabric. This seems to indicate that the pronounced rotting of lower portions of these specimens results from better pressure-induced contact with the soil, since no evidence of accelerated microbial infection by way of yarn ends was shown by the uniformly rotted trench-buried specimens.

SUMMARY AND CONCLUSIONS

A review is given of some of the literature dealing with the mildewing and rotting of fabrics and with methods for testing the resistance of fabrics to such microbial attack.

The conventional soil burial method for evaluating the resistance of treated fabrics to microbial attack is briefly described and some observed disadvantages of the method are pointed out.

The various physical, chemical, and microbiological factors possibly influencing the reliability of results obtained by the soil burial method are enumerated.

Soil burial tests were carried out in covered outdoor beds, using a special soil consisting of a mixture of equal volumes of coarse sand, clay loam soil, and well-rotted manure. A layer of this soil, 9 to 10 inches deep, was maintained near a moisture content of 28 per cent and a temperature of 85 to 90° F. Untreated, and treated or "rotproofed" 6½-oz. cotton osnaburg and 8½-oz. jute burlap were tested, the treated fabrics containing 10 per cent by weight of copper naphthenate (equivalent to one per cent copper). Fabric strips 9 inches long in the warp direction and 1½ to 2 inches wide were buried vertically by pushing one end down with a metal blade to a depth of 7 inches. Then the soil about each strip was carefully pressed into close contact with the fabric. Repeated burials of untreated strips were made throughout the experiment, but before the same soil was reused it was dug up and pulverized.

Five strips of each sample were removed at frequent intervals for each breaking strength test estimate. Microbial infection of the buried portion of the strips was very uniform. However, the soil moisture, soil temperature, and light conditions of the outdoor beds caused fabric rotting to be most rapid within the 3-inch warp section of the strips extending between the 1- and 4-inch soil depths. Therefore, all breaking strength measurements were made on this section.

The period of burial required for complete rotting (100 per cent loss in breaking strength) of the strips was 6 to 8 days for both untreated cotton osnaburg and untreated jute burlap. In the case of the treated fabrics containing 10 per cent by weight of copper naphthenate (equivalent to 1 per cent copper), the period of burial required for complete rotting of osnaburg was approximately 7 times, and for jute 17 times, as long as for the untreated fabrics.

Additions of nutrients to the soil failed to appreciably accelerate the rate of fabric rotting.

The rate of rotting of untreated fabrics was approximately the same at different times during the experiment.

Tests showed that the soil had: (a) a carbon-nitrogen ratio of 14 to 1; (b) a reaction between pH 7.0 and 7.7; (c) an approximate mechanical composition of 72 per cent sand, 8 per cent silt, 10 per cent clay, and 10 per cent organic matter; (d) a good available supply of the nutrients needed by microorganisms; and (e) a microbial population adequate to rapidly decompose cellulose.

Preliminary tests were made in an indoor bed, using untreated cotton osnaburg. Horizontally buried strips lost their breaking strength at about the same similar rate at different depths below 1 inch, but more slowly at a depth of one-fourth inch. Strips buried at or below 1 inch were completely rotted in 6 days at a soil temperature of 86 ± 2° F. and in 8 days at 75 ± 4° F.

Strips buried vertically in trenches rotted uniformly at different depths, while pushed-down strips rotted most rapidly in their lower portions.

On the basis of the results presented, it is concluded that: (a) an 85 per cent loss in breaking strength be considered as the practical end point of fabric rotting; and (b) the rot resistance of a fabric be expressed as the ratio between the number of days burial required to cause an 85 per cent loss in breaking strength in any given fabric and the number of days burial required to cause this amount of loss in copper naphthenate-treated specimens of similar fabric containing one per cent copper.

ACKNOWLEDGMENTS

The authors are indebted to the following members of this laboratory: R. K. Worner, W. Boudreaux, and D. S. Dearie for the physical tests on the fabrics; and G. M. Savich, F. M. Occhipinti, L. L. Fontaine, A. D. Strate, and L. H. Charbonnet for assistance in the chemical and microbiological work.

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Closing Date for New Product Listings in The Annual Processing Review Number is November 6th. See Page 457.

Rayon Fabrics—

(Continued from Page 444)

Figure XXIV shows the curves obtained by plotitng the wet filling breaking strengths, pounds per thread, of an ironed sample of Fabric III treated by Laundry Method I and Laundry Method II.

Figure XXV shows the curves obtained by plotting the dry warp breaking strengths, pounds per thread, of an air-dried sample of Fabric IV treated by Laundry Method I and Laundry Method II.

Figure XXVI shows the curves obtained by plotting the wet warp breaking strengths, pounds per thread, of an air-dried sample of Fabric IV treated by Laundry Method I and Laundry Method II.

Figure XXVII shows the curves obtained by plotting the dry filling breaking strengths, pounds per thread, of an air-dried sample of Fa ric IV treated by Laundry Method I and Laundry Method II.

Figure XXVIII shows the curves obtained by plotting the wet filling breaking strengths, pounds per thread, of an air-dried sample of Fabric IV treated by Laundry Method I and Laundry Method II.

Figure XXIX shows the curves obtained by plotting the dry warp breaking strengths, pounds per thread, of an ironed sample of Fabric IV treated by Laundry Method I and Laundry Method II.

Figure XXX shows the curves obtained by plotting the wet warp breaking strengths, pounds per thread, of an ironed sample of Fabric IV treated by Laundry Method I and Laundry Method II.

Figure XXXI shows the curves obtained by plotting the dry filling breaking strengths, pounds per thread, of an ironed sample of Fabric IV treated by Laundry Method I and Laundry Method II.

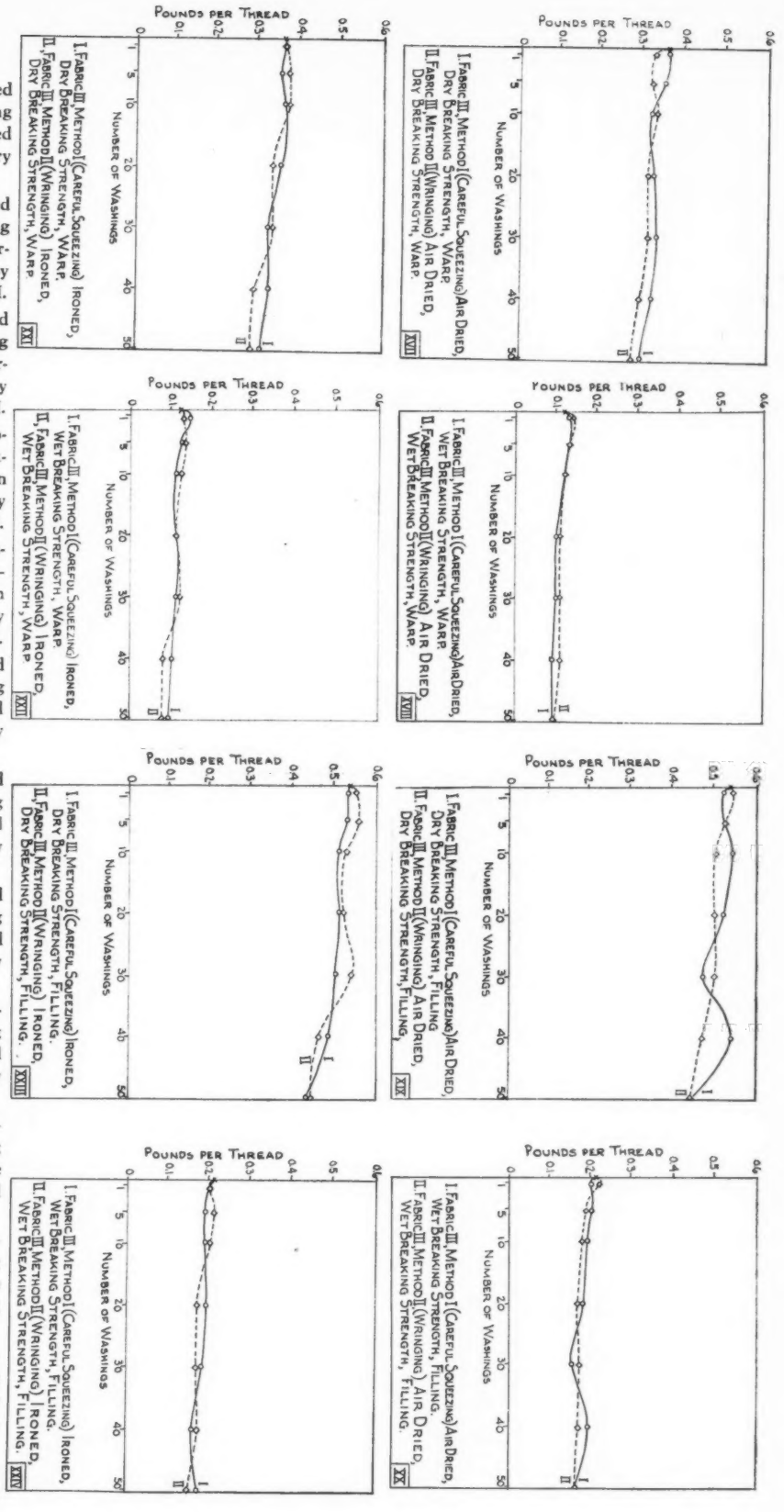
Figure XXXII shows the curves obtained by plotting the wet filling breaking strengths, pounds per thread, of an ironed sample of Fabric IV treated by Laundry Method I and Laundry Method II.

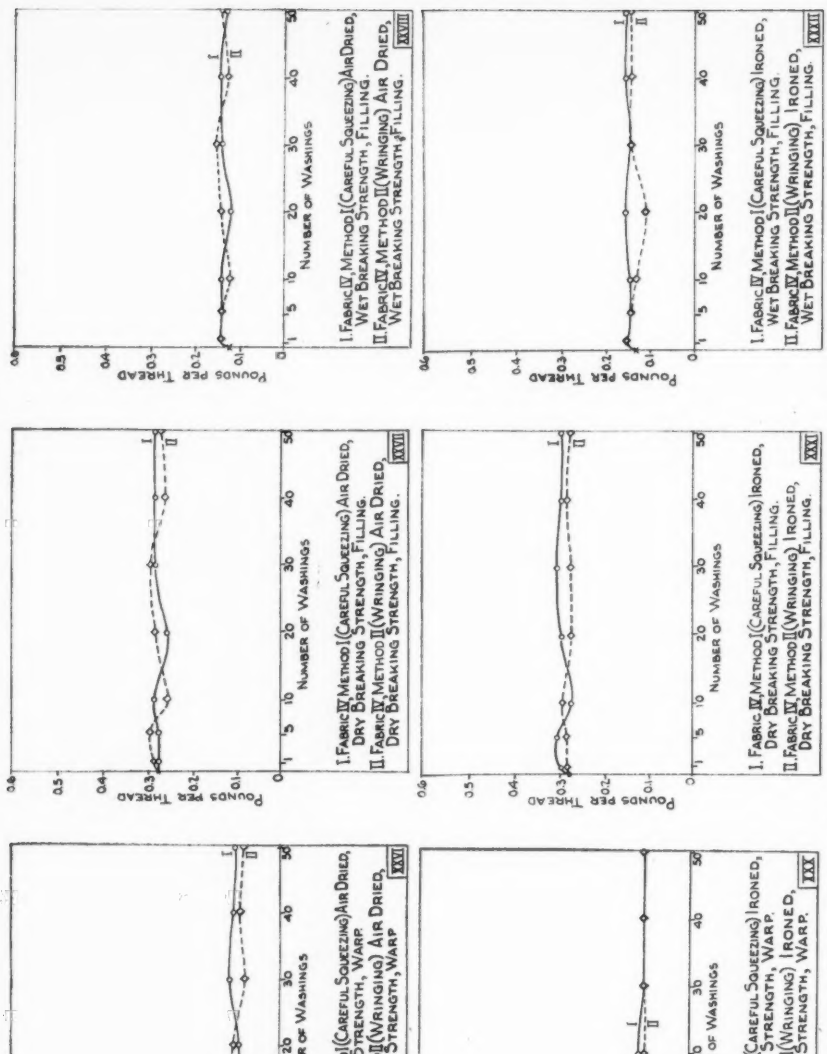
Figure XXXIII shows the curves obtained by plotting the dry bursting strength in pounds of an air-dried sample of Fabric V treated by Laundry Method I and Laundry Method II.

Figure XXXIV shows the curves obtained by plotting the wet bursting strength in pounds of an air-dried sample of Fabric V treated by Laundry Method I and Laundry Method II.

Figure XXXV shows the curves obtained by plotting the dry bursting strength in pounds of an ironed sample of Fabric V treated by Laundry Method I and Laundry Method II.

Figure XXXVI shows the curves obtained by plotting the wet bursting




POUNDS PER THREAD
NUMBER OF WASHINGS
I. FABRIC IV METHOD I (CAREFUL SQUEEZING) AIR DRIED, DRY BREAKING STRENGTH, FILLING.
II. FABRIC IV METHOD II (WRINGING) AIR DRIED, DRY BREAKING STRENGTH, FILLING. XXVI
I. FABRIC IV METHOD I (CAREFUL SQUEEZING) AIR DRIED, WET BREAKING STRENGTH, FILLING.
II. FABRIC IV METHOD II (WRINGING) AIR DRIED, WET BREAKING STRENGTH, FILLING. XXVII
I. FABRIC IV METHOD I (CAREFUL SQUEEZING) AIR DRIED, DRY BREAKING STRENGTH, WARP.
II. FABRIC IV METHOD II (WRINGING) AIR DRIED, DRY BREAKING STRENGTH, WARP. XXV
I. FABRIC IV METHOD I (CAREFUL SQUEEZING) AIR DRIED, WET BREAKING STRENGTH, WARP.
II. FABRIC IV METHOD II (WRINGING) AIR DRIED, WET BREAKING STRENGTH, WARP. XXVIII
I. FABRIC IV METHOD I (CAREFUL SQUEEZING) IRONED, DRY BREAKING STRENGTH, WARP.
II. FABRIC IV METHOD II (WRINGING) IRONED, DRY BREAKING STRENGTH, WARP. XXIV
I. FABRIC IV METHOD I (CAREFUL SQUEEZING) IRONED, WET BREAKING STRENGTH, WARP.
II. FABRIC IV METHOD II (WRINGING) IRONED, WET BREAKING STRENGTH, WARP. XXX
I. FABRIC IV METHOD I (CAREFUL SQUEEZING) IRONED, DRY BREAKING STRENGTH, FILLING.
II. FABRIC IV METHOD II (WRINGING) IRONED, DRY BREAKING STRENGTH, FILLING. XXIII
I. FABRIC IV METHOD I (CAREFUL SQUEEZING) IRONED, WET BREAKING STRENGTH, FILLING.
II. FABRIC IV METHOD II (WRINGING) IRONED, WET BREAKING STRENGTH, FILLING. XXIX

strength in pounds of an ironed sample of Fabric V treated by Laundry Method I and Laundry Method II.

DISCUSSION OF FINDINGS

Fabric Number I was a crepe with an initial dry breaking strength of 46 pounds per one-inch strip in the warp and 44 pounds in the filling (0.4600 x 0.6283 pounds per thread) in the dry condition and 11 pounds per one-inch strip in the warp and 16 pounds in the filling (0.1100 x 0.2141 pounds per thread) in the wet condition.

This fabric suffered only slight losses in dry strength in the warp direction during the first and through the fifth washing, when it was air dried, whether gentle squeezing or wringing were applied. From the fifth through the fiftieth successive washing, the losses became only slightly greater than had occurred by the end of the fifth washing, for the procedure involving gentle squeezing, and were only slightly greater where wringing was done than when gentle squeezing was carried out. In the first case, the overall loss from the initial strength through the end of the fiftieth washing was 18 per cent, and in the second 26 per cent. Neither of these losses was serious for 50 successive washings on a fabric of the initial strength shown by this fabric.

In the filling direction, the initial dry strength was higher on a per thread basis than was the case with the warp. The losses were again about of the same order of magnitude as was found with the warps, with the specimens which were wrung showing somewhat greater intermediate losses from the fifth through the thirtieth washing treatments; but the latter were practically identical with the former in strength after 40 and again after 50 washings.

The findings in dry strength were somewhat similar for the ironed and for the air-dried series for this fabric.

In wet strength, the graphs for warp and filling, whether air-dried or ironed, were virtually superimposed over each other both for the series of specimens which were given gentle squeezing and those which were given a wringing treatment. The results with the wet strength were more important in this case than those with the dry, since the initial wet strength was sufficiently low to present difficulty. Hence, if either of the two treatments under investigation had caused greater further losses than the other, it would not have been a recommendable treatment.

Fabric II was another crepe with an initial strength of 46 x 51 pounds per one-inch strip (0.4107 x 0.6637 pounds per thread) in the warp and filling directions, respectively, in the dry condition. The initial wet strength was 15 x 14

pounds per one-inch strip (0.1100 x 0.2141 pounds per thread).

In the warp direction, the graphs representing the strength per thread of the respective specimens, whether they were squeezed gently or wrung, air-dried or ironed, were practically identical throughout, with these exceptions. The fabrics in the air-dried series given a gentle squeezing treatment were slightly lower in dry warp strength through the intermediate washings (10 to 20) than was the case with the series given the wringing treatment. In the filling direction, the strength results were practically the same up to the thirtieth washing. After the thirtieth and fiftieth washing the series which was wrung was slightly lower in strength than that which was squeezed gently.

In the wet strength series for this fabric, there were no notable differences in results except after the fiftieth washing for the air-dried filling specimen; in this case the specimen which had been squeezed gently had a final wet strength of 0.2513 pounds per thread as compared with 0.1957 pounds per thread for the specimen which had been given the wringing treatment.

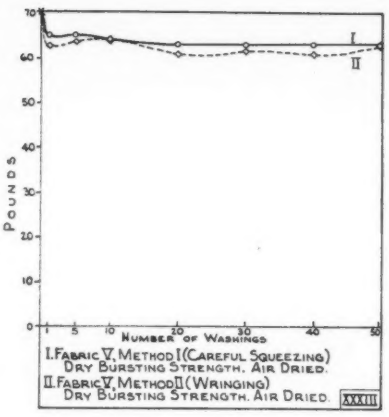
Fabric III, a crepe, and Fabric IV, a print taffeta, showed no distinctive differences in the strengths of the fabrics given a series of 50 washings with gentle squeezing as opposed to wringing in the four washing series which have been described.

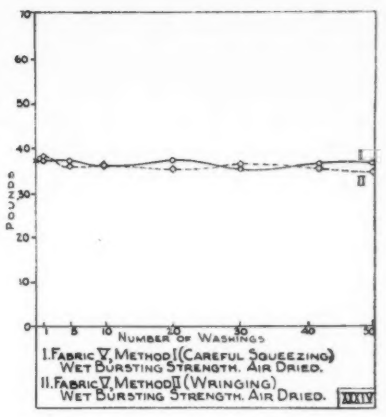
Fabric V, a Tricot knitted fabric, exhibited no general differences in strength, whether the fabric was squeezed gently or given a wringing treatment throughout a series of 50 washings. This was true whether the fabric was air dried or ironed, or whether dry or wet strength was measured.

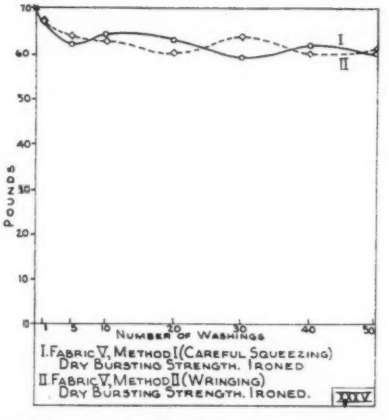
SUMMARY AND CONCLUSIONS

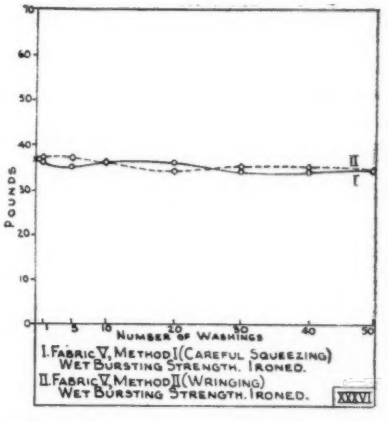
A series of five rayon fabrics representing different types widely used by the consumer were given two series of 50 hand washing treatments; in the first the fabrics were given a gentle squeezing treatment in removing water, and in the second the fabrics were given a hand wringing treatment. Two sub-series of washings were given within each treatment. In one the fabrics were air dried, and in the other they were ironed. Wet and dry breaking strength measurements were made after certain of the washings in each series.

The breaking strength results for the four woven and the bursting strength for the one knitted fabric in the study were closely similar throughout, except for a few cases which have been discussed, whether the fabric was squeezed gently or wrung during the course of the hand


POUNDS
NUMBER OF WASHINGS
I. FABRIC V, METHOD I (CAREFUL SQUEEZING)
DRY BURSTING STRENGTH. AIR DRIED.
II. FABRIC V, METHOD II (WRINGING)
DRY BURSTING STRENGTH. AIR DRIED.
XXXIII


POUNDS
NUMBER OF WASHINGS
I. FABRIC V, METHOD I (CAREFUL SQUEEZING)
WET BURSTING STRENGTH. AIR DRIED.
II. FABRIC V, METHOD II (WRINGING)
WET BURSTING STRENGTH. AIR DRIED.
XXXIV





washings. The dry and wet strengths of rayons should unquestionably be taken into consideration in any washing instructions which are promulgated. Nevertheless, the results for the types of fabrics included in this study indicate that it may not be necessary to include in hand washing instructions for rayon the invariable direction that the rayon fabric be squeezed gently as a means of removing water.

Note: The authors wish to thank Pauline Beery Mack Ph.D., director, and J. Fred Oesterling Ph.D., assistant professor of textile chemistry, of the Ellen H. Richards Institute for valued advice concerning various aspects of this study.

Annual Processing Review Number

THE NINTH ANNUAL PROCESSING REVIEW NUMBER of the AMERICAN DYESTUFF REPORTER will appear on December 4th, 1944. One of the special features of past issues, which will be continued this year, is a listing of new products for the textile wet processing field.

Manufacturers of dyestuffs, textile chemicals, wet processing machinery and other equipment are invited to submit information concerning their new products which have been brought out since November, 1943.

This information should include the trade name of the product and a brief description of its uses. Closing date for new product listings is November 6th, 1944.

OBITUARY

P. E. HERMAN

P. E. HERMAN, retired salesman of the Monsanto Chemical Company's Organic Division, died September 23 at his home in Cincinnati, following a long illness. Mr. Herman was 75 years old.

A graduate pharmacist, with a long drug and chemical background, Mr. Herman entered Monsanto's service in 1925, and for 11 years covered a southern and mid-Western sales territory. He went on a part-time schedule in 1936, limiting his sales territory to the Cincinnati area.

Mrs. Herman died several years ago. Surviving are two sons, Justin and Gene.

• APPOINTED MANAGER, PHILADELPHIA BRANCH

The United States Testing Company, Inc., has appointed E. J. Donohoe manager of the Philadelphia branch. Mr. Donohoe is a native of Lowell, Massachusetts, and received his degree as a textile engineer at Lowell Textile Institute in 1934. He started as a technician ten years ago and served in many capacities for the company since that time. He was manager of the New York office for the past six years, serving the New York textile and garment industries.

• T.R.I. ANNUAL MEETING

"The Textile Industry — Re-Birth or Second Childhood?," the subject of an address by Dr. Gustavus J. Esselen at the luncheon of the annual meeting of the Textile Research Institute, Inc., at the Hotel Roosevelt, New York, Nov. 10, 12:30 p.m., will also be the theme of the meeting as a whole.

At the other sessions, the progress of the Institute on several fronts—fundamental research, applied research, economic research, and education—will be reported and discussed.

The first session will start at 10 a.m., and will be conducted by Wm. D. Appel, chairman of the Applied Research Committee of the Institute, and Giles E. Hopkins, Director of Applied Research. Subjects to be covered will include: (1) the cotton carding project, in a report by Prof. Elliot Grover, of the North Carolina State College Textile School; (2) warp sizing by Prof. William Shinn, also of the North Carolina State College Textile School; and (3) the radiation drying project, by Dr. Richard Wilhelm, of the Institute's Applied Research Staff at Princeton, N. J.

The members' business meeting, at 11:30 a.m., will be brief and will include election of officers and directors; action on proposed changes in the by-laws; and report of the president and executive secretary, Fessenden S. Blanchard.

The first session after the luncheon will be held at 2:30, and will be conducted by Robert R. West, Chairman of the Economic Research Committee, and Douglas G. Woolf, Director of the Economic Research. Dr. A. M. McIsaac, of the Department of Economics of Princeton University, will present a report on the project of the post-war status of the textile industry, now being conducted under his direction. At this same session, Dr. Fred M. Feiker, Chairman of the Educational Committee of the Textile Foundation and of the Institute, will report on the progress of that committee.

The last session, starting at 3:30 p.m., will be conducted by Dr. Robert E. Rose, chairman of the Fundamental Research Committee of the Institute, and Chairman of the Scientific Advisory Committee of the Foundation, and will deal with fundamental research possibilities and opportunities in the post-war textile industry.

All persons interested in the textile industry and in textile research, whether or not members of the Institute, are invited to attend all sessions of the annual meeting except the business session, which is open to members only. Requests for reservations for the luncheon should be sent to the Textile Research Institute, Inc., 10 East 40th Street, New York 16, N. Y. Luncheon tickets are $2.50 each. Attendance at other sessions is free, and there will be no registration fee.

This is a strategic period in the development of textile research. Representatives of all organizations engaged in textile research are particularly invited to attend.

• NEW DYESTUFF RESEARCH LABORATORY

To assist textile converters and finishers who are licensees under the American Viscose Corporation's "Crown" Tested Plan, the company has established a Dyestuff Research Laboratory in its New York offices. Under the "Crown" Tested Plan, fabrics made by licensees that contain the American Viscose Corporation's rayon are subjected to numerous tests for consumer serviceability.

One of the principal reasons for establishing the dyestuff laboratory is to simplify and speed up the procedure of testing dyed and finished fabrics to determine whether or not they will meet the standards of the "Crown" Tested Plan. Another objective is to develop dye formulae that meet "Crown" Tested Plan specifications, which can be made available to converter and finisher licensees operating in cooperation with the plan.

• DR. BOLTON TO RECEIVE PERKIN MEDAL

The American Section of the Society of Chemical Industry announced recently the election of Dr. Elmer K. Bolton, Chemical Director of E. I. du Pont de Nemours & Company, Wilmington, Delaware, to receive the Perkin Medal in recognition of his outstanding accomplishments in the field of industrial research. Presentation of the medal will be made at a dinner meeting of the Society at the Commodore Hotel, New York City, on January 5, 1945. Dr. Bolton will be the 39th member of the group of distinguished chemists to receive this medal.

Dr. Bolton entered the employ of E. I. du Pont de Nemours & Company in 1915 and in 1916 was placed in charge of a group of chemists to study the preparation of synthetic dyes. This was the beginning of a long association with the chemistry and manufacture of dyestuffs. Dr. Bolton is particularly recognized for his leadership in the synthesis of the first general-purpose synthetic rubber to be developed either in this country or abroad for his direction of nylon research.

Dr. Bolton is a member of various scientific societies, including the American Chemical Society, of which he served as Regional Director from 1936 to 1938. He was elected Director-at-Large for the period 1940-43. He is also a member of the Society of Chemical Industry and the American Institute of Chemical Engineers. In 1941, Dr. Bolton received the Chemical Industry Medal, which is awarded annually by the American Section of the Society of Chemical Industry, for "valuable application of chemical research to industry."

An informal reception for the medalist will be held at the Commodore Hotel immediately before the presentation dinner. The Perkin Medal will be presented to Dr. Bolton by Dr. Marston T. Bogert, Senior Past President of the Society.

• MANAGER OF COMPREHENSIVE FABRICS INC.

The acquisition of C. D. Couch, Jr., to be merchandise manager of Comprehensive Fabrics, Inc., was announced by Joseph A. Kaplan, president, as part of the company's preparations for greatly expanded postwar merchandising activity in goods made of Koroseal, the B. F. Goodrich synthetic.

Mr. Couch has been director of product applications for the Celanese Corporation plastic division. Previously he was Washington representative on war applications of that company's products.

Koroseal at present is still "almost 100 per cent gone to war," Mr. Kaplan said, in wire and cable insulation for naval vessels and in rainwear and special-purpose clothing. Wartime experience with it has compressed into months, he said, progress in formulating and handling methods that ordinarily would have taken years, and as a result new and revolutionary types of materials will be available for apparel, household and industrial uses. Facilities for production of the raw material, polyvinyl resin, have been expanded nearly ten-fold in the last five years.

• NEW ELECTRONIC DEVICE

An improved electronic recording instrument, said to be so compact and well balanced it can withstand drop hammer vibrations and still maintain a sensitivity of six points in 10,000, is announced by the Brown Instrument Co., Philadelphia, precision industrial instrument division of Minneapolis-Honeywell Regulator Co. The latest models of the instrument, the electronic potentiometer, will be shown at the National Chemical Exposition to be held in Chicago, November 15 to 19.

The continuous balance theory of new strip and circular chart electronic potentiometers is emphasized, said Brown company engineers, by the fact the improved models can be operated upside down as well as in an upright position. Earlier models of this instrument have been used successfully in speedier and more uniform production of high octane gasoline, butadiene, styrene, plastics, ball bearings, aluminum and other wartime products. Under the name of the flight test recorder, they have been and are still being used for testing airplane parts and engines.

• JOINS UNITED CHEMICALS BOARD

Oliver R. Grace of Sterling, Grace & Company, Members of the New York Stock Exchange, has been elected to the Board of Directors of United Chemicals, Inc., New York.

• TO TRANSFER RESEARCH TO PRINCETON

The Board of Directors of the Textile Foundation of Washington, D. C., has decided upon the immediate transfer of its program of fundamental research in the field of textile science from the National Bureau of Standards, Washington, D. C., where this research program has been carried out for the last eight years, to a new location at Princeton, N. J., in a property provided by the Textile Research Institute, Inc., of New York. As a result of this transfer it becomes possible to integrate the research effort of the Textile Foundation with the program of training and education at the graduate level which forms one of the five objectives of the Textile Research Institute in its campaign to provide the whole textile industry, covering natural and synthetic fibers alike, with a research organization and personnel adequate to the needs and problems of the post-war era.

Through the courtesy of President H. W. Dodds of Princeton University the Textile Foundation has secured the part-time services of Professor Henry Eyring as Acting Director of the research program of the Textile Foundation and the Textile Research Institute. Under his direction it is planned to engage immediately in a broad program of research effort in the chemistry and physics of fibers and to initiate, under a fellowship plan, the educational activities of the Textile Research Institute. The decision to initiate this immediately instead of in the post-war period permits the research-training program to go into effect during the academic year 1944-45, thus advancing by at least a year the provision of trained personnel for the post-war era.

Dr. Robert E. Rose, of Penn's Grove, New Jersey, who recently retired from his position as director of the E. I. duPont deNemours & Co., technical laboratory, and who is chairman of the Scientific Advisory Committees of both the Textile Foundation and the Textile Research Institute, has agreed to associate himself with the development as Research Counselor of both organizations, and will cooperate with Professor Eyring in the solution of the problems involved.

During the war years, the Textile Foundation has placed practically all of its research facilities in Washington at the disposition of Government agencies for the solution of urgent war problems. These activities will be maintained by the Foundation at Washington, D. C., until the expiration of all existing Government contracts.

• RESEARCH ORGANIZATION TO BE FORMED

Dr. Milton Harris announces his resignation as Director of Research of the Textile Foundation and the Textile Research Institute, to become effective January 1, 1945. At that time he and a number of members of the staff who have been working with him will continue their activities in a research and consulting organization to serve the textile and allied industries under the name of the Milton Harris Associates. Associated with him will be Dr. Lyman Fourt, who will be in charge of physics and bio-physics, Henry A. Rutherford, in charge of organic development, and Arnold M. Scokne, in charge of physical-chemical research. The laboratories will be located in Washington, D. C.

• TESTIMONIAL DINNER

A testimonial dinner will be given to Dr. Maximilian Toch, internationally known paint technologist, by the New York Chapter of the American Institute of Chemists, in the Building Trades Employers' Club Rooms, No. 2 Park Avenue, New York City, on October 27.

Dr. Toch will be presented with a certificate of honorary membership in The American Institute of Chemists.

Among the speakers at the dinner will be Dr. Gustav Egloff, of Universal Oil Products Company, and president of the Institute; George Baekeland, president of Bakelite Corporation; and Marston T. Bogert, professor emeritus of Columbia University. Dr. Marston L. Hamlin, of the Barrett Division of Allied Chemical & Dye Corporation, and chairman of the New York Chapter, will preside.

Dr. Toch, president of Toch Brothers, Inc., and vice-president of Standard Varnish Works, Inc., is a charter member and former president of The American Institute of Chemists. He holds the L.L.B. degree from New York University, the C.E. degree from Cooper Union, and the honorary Sc.D. degree from the University of Peking, China, where he was honorary professor in 1924.

Dr. Toch was former professor of the chemistry of fine arts at the New York Academy of Design, and is an authority on the materials for permanent painting of pictures and the restoration of art paintings. He has also won many prizes in photography and is a Fellow of the Royal Photographic Society of London.

• APPOINTED MANAGER, PIGMENT DEPT.

The appointment of John F. Daley as general manager of the Pigments Department, has been announced by E. I. du Pont de Nemours & Company. Mr. Daley succeeds the late Carl H. Ruprecht.

Mr. Daley, who is 49, has been director of sales of the Pigments Department since 1942 and recently has been acting assistant general manager. From October, 1942, until last June he was on leave of absence as deputy field director of ammunition plants in the Office of the Chief of Ordnance, with headquarters in St. Louis.

In 1940 he was one of a group of production men selected to operate the military explosives projects then being

undertaken by Du Pont for the U. S. Government. He was appointed works manager at the Indiana Ordnance Works, at Charlestown, Ind., first of the ordnance installations to be authorized, in January, 1941.

The Pigments Department business comprises a complete line of chemical dry colors and white pigments, which include titanium dioxide, lithopone and leaded zinc oxide. The principal consumers of its products are manufacturers of paints, linoleum, printing inks, window shade cloth, oil cloth, rubber products, paper, leather and leather finishes, printed textiles, ceramics and soap. The Department operates plants at Newark, N. J., Edge Moor and Newport, Del., and Baltimore, Md., and research laboratories at Newark and Newport.

• ALIPHATIC DERIVATIVES

New aliphatic compounds consisting of the even numbered normal hydrocarbons from C_8 through C_{18} and the corresponding olefins, alcohols, ethers, mercaptans, thioethers, disulfides, and sulfonic acids have been developed by the Chemical Division of the Connecticut Hard Rubber Co., New Haven, as a result of their research work in the synthetic rubber field. Most of these new chemicals are available in commercial quantities and are supplied in various grades from technical to "fine chemical," the company announced recently.

The saturated n-alkanes are suggested for use as organic intermediates, laboratory solvents, and as standard hydrocarbons. The olefins, with the double bond at the first carbon, are interesting in organic synthesis, particularly as a starting material for dispersing agents, resins, oil additives, pharmaceuticals, and insecticides. Certain branch chain olefins, isomeric with the n-compounds of this series are available for laboratory research. The alcohols are also suggested as intermediates for chemical synthesis and for use in cosmetic preparations.

The aliphatic ethers are an interesting series which can be used as plasticizers, impregnating agents, solvents, heat transfer liquids, as well as in the cosmetic field it is stated.

The high-purity aliphatic mercaptans are said to present possibilities as polymerization conditioners, intermediates for synthesis, corrosion inhibitors, oil additives, insecticides, flotation agents, and alarm odorants.

The thioethers and the disulfides are suggested for use as plasticizers, stabilizers, insecticides, oil additives, and flotation agents. The aliphatic sulfonic acids, available only in experimental quantities, are of interest as hydrogen soaps, and the salts as stabilizers, dispersing agents, wetting agents, and oil additives. The corresponding sulfones are available in limited amounts for experimental work.

• ABSTRACTS FROM CONTEMPORARY JOURNALS •

PRACTICAL NOTES ON MORDANT IDENTIFICATION AND SOME DATA ON INDIGO. *The Dyer,* 92, 2, 55, July 21, 1944.

The following method is given for the identification of mordants on the fiber. *Incineration procedure:* One gram of the finely divided sample is placed in a porcelain crucible and heated over a Bunsen flame long enough so that combustion is complete. Iron mordants leave a reddish-brown residue; chromium mordants leave a green residue; aluminum mordants leave a white residue; copper mordants leave a black residue. Confirming tests are also given. *To determine whether goods have been Turkey red dyed:* A thread from the sample, 2 to 3 cm. long, is placed on a watch glass and wetted with 7 or 8 drops of concentrated sulfuric acid. After the fiber is dissolved, 0.5 cc. of water are carefully added. If the solution turns a clear bright yellow, the presence of alizarin is indicated. *Testing quality of indigo dyeings:* One or two threads are burned over a clean white porcelain plate. According to the grade of dyeing there will form on the white surface a stain ranging in color from a light blue to a dark blue with a greenish shade. *To determine whether a sample is dyed with indigo:* A 2 to 3 cm. square sample is placed in a small beaker and covered with chloroform. This is shaken. If dyed with indigo the sample loses the dyestuff and the chloroform turns blue. For comparative purposes a number of samples can be treated the same way and the resulting color of the solutions will indicate the relative amounts of indigo in the dyeings.

THE DYEING OF ACID AND CHROME COLORS ON WOOL WITH PHOSPHORIC ACID. Edgar I. Noble. The *Textile Journal of Australia.* Vol. 19, No. 2, page 71, April 15, 1944. (A paper presented before a meeting of the Society of Dyers and Colorists of Australia).

The possibility of using ortho-phosphoric acid in dyeing acid and chrome colors on wool had been considered by the author for some time. At the present time the use of phosphoric acid would relieve the strain on the chemicals used in the manufacture of acetic and formic acids, now required for war purposes.

The results of a survey of the most widely used acid and chrome colors and the principles underlying their application are given. The use of sulfuric, acetic, formic and phosphoric acids are compared. The author draws the following conclusions:

Phosphoric acid is cheap and could replace sulfuric acid with better levelling and penetration and less damage to the wool and to cellulosic fibers present. Phosphoric acid offers about twice the money value of formic acid and about five times the value of acetic acid. Phosphoric acid, buffered suitably with soda ash, would provide an acid as mild as acetic acid, with further advantages for the dyeing of yarns and pieces, or wherever extreme levelling and accurate matching is essential. Phosphoric, acetic, formic and sulfuric acids, when used in dyeing in their equivalent combining qualities produce similar amounts of exhaustion of the color on the wool. Only if the dyeing time is short or if dyeing is done below the boil, is this ratio altered and then the weaker the acid used, the more is needed. The dyeing of acid and chrome colors may be explained by the present chemical theories of wool dyeing. There is no difficulty in changing over to the use of phosphoric acid, as the dyer merely has to change the amount of acid he uses at present for the corresponding amount of phosphoric acid indicated in Table VII.

The table (VII) referred to, is as follows:

TABLE VII
Relative Amounts of Acid for Practical Dyeing

Acid	*Weight (grams)*	*Volume mls. (ccs)*	*Volume (pints)*
Sulfuric Acid 96%	1,000	1,000	1
Formic Acid 90%	1,010	1,565	1½
Phosphoric Acid 75%	2-2,536	2,200-2,800	2½
Acetic Acid 60%	2-3,000	3,500-5,300	3½-5½

Note: The higher proportion of acetic acid will be required if the time of dyeing is short or below the boil, or for addition. The larger amount of phosphoric acid is required with wool in dyebaths below pH 4.6.

PLASTICS AND THEIR FUTURE IN THE TEXTILE INDUSTRY. H. Jones, Journal of the Society of Dyers and Colourists, Vol. 60, No. 9, page 225, September, 1944.

There are two principal methods for controlling the properties of plastic materials: by varying the degree of complexity, i.e., the molecular weight, and by suitable choice of raw materials.

The use of plastics in the future for the textile industry are divided into two phases: plastics as fiber forming materials and plastics in combination with existing textiles.

Under the first classification we might expect that the rayon manufatcurers will include resinous or other plastic materials to alter the physical properties of the rayon fibers. Thus it is probable that many of the alkaline-condensed resins, e.g., phenol- and cresol-formaldehyde resins, urea- and melamine-formaldehyde resins, urea-modified alkyd resins, as well as other types of resins, will be incorporated in the viscose dope before spinning and coagulation. Changes in elasticity, anti-crease properties, water absorption, and strength are possible in this manner. The same is true of acetate rayons. There will be still further interest in nylon because of its versatility which can be brought about by changing the raw materials. There will also be increasing interest in the polyesters as fiber-forming materials although little is known at present regarding their properties. Vinyon shows promise in increased use for fish nets, ropes, sails and filter cloth. It is bacteria, and mildew-proof. Saran, developed from polyvinylidene chloride by Dow Chemical Co., has so far been produced principally as a coarse filament by hot extrusion but there will be further developments in it. Polystryrene has so far been used as a plastic base and as a resin for lacquer work but its high water-resistance and the fact that, in film form, it permits diffusion of moisture makes it of future interest as a fiber-forming material. The thermo-setting resins have great possibilities in the textile field. The dyeing of many of these projected fibers will, no doubt, present many difficulties and eventually mass dyeing of rayon dopes may become widespread.

Under the second classification (the use of plastics in combination with existing textiles) there are three sub-divisions: (1) bonding agents for films, fabrics and pigments; (2) finishes of a more or less permanent nature; (3) films such as are found in coated fabrics, leathercloth and oiled silk.

Plastics can be used for bonding fibers while still retaining the structure of the fiber. Thus felt-like products can be produced from smooth fibers. Packed fibers can be impregnated with plastics by means of solutions or aqueous dispersions.

There are three principal methods of bonding woven fabrics: (1) the Trubenizing process which employs a fabric containing about 60 per cent cellulose rayon between two layers of cotton cloth. It is softened with acetone-water mixtures, dried, and calendered. The result is a permanently stiffened fabric which is flexible and launderable. (2) The second method is similar to (1) but uses a film of cellulose acetate. (3) The Fusella process uses a layer of fabric which has been impregnated with a thermoplastic mixed acrylate-vinyl acetate resin, the bond obtained being refused by hot ironing.

Other cellulose esters rather than cellulose acetate may be more suitable for bonding on account of their higher intrinsic plasticity.

Rubber is also used for flexible multiply fabrics. Many of the rubber substitutes, in addition to replacing rubber, are excellent for use as bonding agents.

The use of plastics as bonding agents for pigments is already well known—a good example being the Aridye process.

The use of plastics as finishing agents has practically no limit as by choosing the proper plastic most any result may be obtained. There is much experimental work going on at present.

In coated fabrics, many of the future developments lie in the use of more rubber-like plastics for the production of leathercloths for upholstery and furnishings. The use of plastics in this field will offer many advantages, e.g., better wearing properties, flame-resistance, resistance to water and solvents, and better ageing on account of less oxidation.

Among the products which are being used for coating fabrics and whose use will probably increase a great deal in the future are: polyvinyl chloride, mixed esters, e.g., polyvinyl chloride-polyvinyl acetate, cellulose acetate plastics, polyvinyl butyral resin, higher polymers of polyvinyl alcohol.

THE ACTION OF ETHYLENE SULPHIDE ON WOOL. T. Barr and J. B. Speakman. Journal of the Society of Dyers and Colourists, Vol. 60, No. 9, page 238, September, 1944.

The authors summarize the results of their investigations as follows:

In the belief that animal fibers might be strengthened by increasing the number of disulfide cross-linkages between the peptide chains, human hair fibers were treated with aqueous-alcoholic solutions of ethylene sulfide at 22.2° C and various pH values. It was hoped to discover conditions favoring the reaction of basic and other side-chains with ethylene sulfide to give mercaptans—

$$R.NH_2 + (CH_2)_2S = R.NH.CH_2CH_2SH.$$

the fibers being afterwards treated with potassium persulfate to form disulfide cross-linkages from the mercapto-side-chains. Instead of strengthening the fibers, however, the process caused considerable weakening, especially at high pH values. Before examining the behavior of ethylene sulfide under other conditions, use was made of this observation to develop a method of imparting an unshrinkable finish to wool fabrics. The latter were impregnated with sodium hydroxide solution and then treated with an aqueous-alcoholic solution of ethylene sulfide. In the alkaline solution, the mercaptans produced by polymerization of ethylene sulfide cause preferential disulfide bond breakdown in the surface scale structure, with the result that a high degree of unshrinkability is realized. The method has little practical importance because it would obviously be preferable to employ alkaline solutions of mercaptans in aqueous alcohol or other solvents, as has been envisaged elsewhere.

It seemed possible that the failure of ethylene sulfide to react to any marked extent with human hair, except in presence of alkalies, was due to the low temperature of treatment and the inaccessibility of reactive side-chains to ethylene sulfide dissolved in mixtures of alcohol and water. Fibers were therefore treated in the vapor from mixtures of ethylene sulfide and water at 50° C. in the hope that the water swollen fibers would be more accessible to the ethylene sulfide and would react with it more readily at the higher temperature. Under these conditions, ethylene sulfide polymerizes within the fibers, which increase considerably in weight and diameter and develop a high degree of resistance to extension. In addition, the water adsorption capacity of the fibers is decreased by about one-third. By determining the changes in length and diameter of fibers containing increasing amounts of ethylene sulfide polymer up to 300 per cent by weight, it has been shown that about 21 per cent by weight of polymer may be deposited in human hair fibers without causing any increase in volume at 65 per cent R.H. Since the density of the polymer is 1.29 g. per cc., the dead space available for accommodating polymer in human hair fibers was found to be about 21 per cent by volume. This method of determining dead space is, of course, capable of application to other fibers with ethylene sulfide or other monomers.

One of the two general methods of imparting an unshrinkable finish to wool fabrics is based on modification of their elastic properties. In particular, an increased resistance to deformation is desir-

able, and since the deposition of ethylene sulfide polymer within animal fibers is particularly effective in producing this result, the milling shrinkage of wool fabrics treated with the vapor from mixtures of ethylene sulfide and water at 50° C for various times was examined. Compared with that of untreated fabrics, the shrinkage of treated fabrics decreased progressively with increasing time of exposure to the vapor, a high degree of unshrinkability being obtained after treatment for four hours. Ethylene sulfide is thus unique in being the only compound known to be capable of producing unshrinkability by modifying either the scaliness or the elastic properties of wool fibers, according to the conditions of use. It will, of course, be recognized that the polymerization of monomers within wool and related fibers is a general method of producing unshrinkability, and an important field of research, which may be regarded as a development of previous work on the impregnation of fibers with condensation polymers, is thus revealed.

FLAX CELLULOSE. W. A. S. White and T. N. Richardson. J. Textile Inst., 1944, 35, T53-60, through J. Soc. Dyers & Col., Sept., 1944.

The usual difficulty of removing the insoluble lignified material in the determination of the fluidity of flax cellulose in cuprammonium is overcome by adding pyrogallol, which is an effective antioxidant. This permits exposure of the cuprammonium to light and air during filtration, without concomitant degradation of the dissolved cellulose and consequent increase in fluidity.

Method—The material is boiled in 2% sodium hydroxide for 6 hr. and then finely powdered. The powder is assumed to contain 7% water and 2% insoluble matter, and a quantity sufficient to give a 0.5% solution of cellulose is dissolved in standard cuprammonium in a completely-filled stoppered test-tube (25 ml.) and 4% pyrogallol (on the weight of cellulose) is added. The tube contains a small cylindrical piece of iron to mix the contents and is shaken overnight on a slowly revolving wheel. The solution is filtered into a B.C.I.R.A. capillary viscometer through glass wool or a coarse fritted glass immersion filter attached to a glass tube leading through a rubber stopper inserted in the wide end of the viscometer, and gentle suction applied by means of a vacuum pump connected to the capillary end of the viscometer. The fluidity of the solution is then determined in the usual manner.

The method is more sensitive during the initial stages of degradation than the method involving determination of the cellulose solubility number. F. F. E.

TENDER PLACES IN PRINTED RAYONS. Anon. Ciba Review, 1943, No. 47, 1715, through J. Soc. Dyers & Col., Sept., 1944.

An example is given of tendering in printed lustrous rayon fabrics dyed with direct diazotized and developed dyes and discharged with white or vat color discharges. After printing, the pieces were padded on the printing machine with a weak solution of Albatex BD and gum tragacanth in order to avoid the formation of doctor streaks during aging, dried and aged as usual. The printed portions were completely rotten and even fell out of the body of the piece. These areas wetted much more readily during padding than the unprinted ground, and microscopical examination showed that the fibers were completely flattened. During printing the threads of the material were sharply bent by the engraving of the printing roller and were set in this bent condition by the immediate drying. The pressure of the padding roller, together with the tension set up in the threads by the irregular speed of wetting during the padding operation, caused fracture of the fibrillae on drying, which was only evident after the thickening had been washed out. The fault was eliminated by padding with Albatex BD *before* printing, when neither tender places nor doctor streaks made their appearance. F. F. E.

TEXTILE FINISHES AND FIBER IDENTIFICATION STAINS. B. Norwick. Ind. Eng. Chem.; Anal. Ed., 1944, 16, 274, through J. Soc. Dyers & Col., Sept., 1944.

The colors obtained with dye mixtures such as the Hahn stains (I) or the Davis-Rynkiewicz modifications (II) which have been applied for identifying fibers, are affected by pretreatments of rayon fibers. Thus, pre-treatment with caustic soda can lead to colors with (II) which vary from green-yellow to dark blue, depending on the temperature and concentration of the caustic soda. In some cases the nature of the color obtained with (II) may give a general indication of the nature of the pretreatment or the fiber. Thus, blue is associated with cuprammonium rayon, cotton, vinyon, sizes, cationic materials, etc.; yellow with cellulose acetate rayon, nylon, wool, heavy oiling melamine, and aldehyde resins; red with viscose rayon, attacked wool and aldehyde resins. Various families of finishes may be distinguished by test-dyeing before and after special treatments, e.g., enzymes for proteins, boiling 5% sulphuric acid for urea-formaldehyde resins, alcoholic extraction for cationic softeners. Cotton gives yellow dyeings with shrink-resisting urea-formaldehyde finishes, and such finishes may often be detected on one face and not on the other of a given fabric, owing to the use of drying cans on one face only. Incomplete or uneven desizing may be detected similarly. H. I. S.

COMPLETE REPORTS OF THE ANNUAL MEETING OF THE A.A.T.C.C. WILL APPEAR IN FUTURE ISSUES

ALL OF THE PAPERS PRESENTED DURING THE INTERSECTIONAL CONTEST WILL BE PUBLISHED IN THE ANNUAL PROCESSING REVIEW NUMBER WHICH APPEARS ON DECEMBER 4th, 1944

SANDOZ PRESENTS

the Color Achievement of the Month

Sheer Magic

BY

VAN RAALTE

From ivory to honey-gold, sun-burnished rose and beige . . . choice of the right color is one of the secrets of her head-to-toe radiance, her marble-smooth leg-slimness.

Sandoz, while anticipating the return of Nylons, and preparing now for the post-war fibres to come, congratulates Van Raalte on the sheer-textured beauty of wartime stockings such as these.

This month, Sandoz technicians, accustomed to "think ahead with textiles", present for your consideration Visco Brown 2RB, Visco Orange GGA and Visco Brown PG, a group of colors specially selected for the exacting requirements of level-dyeing hose, and for their good unionizing properties on rayon and cotton combinations.

You, too, may profit by consulting with Sandoz regarding your needs for acid, chrome and direct dyes, and auxiliary chemicals for all natural and synthetic fibres. For instance, Sandoz Perlof and Ceranine Finishes are exceptionally well qualified to produce soft texture and correct lustre on modern hosiery.

Sandoz' application laboratories are maintained in New York, Boston, Philadelphia, Charlotte, Los Angeles and Toronto. You will find stocks in those cities. Other branches in Chicago, Paterson and Providence.

Look for another Sandoz "Color Achievement" next month, featuring the work of another leader in the Textile Industry's color parade.

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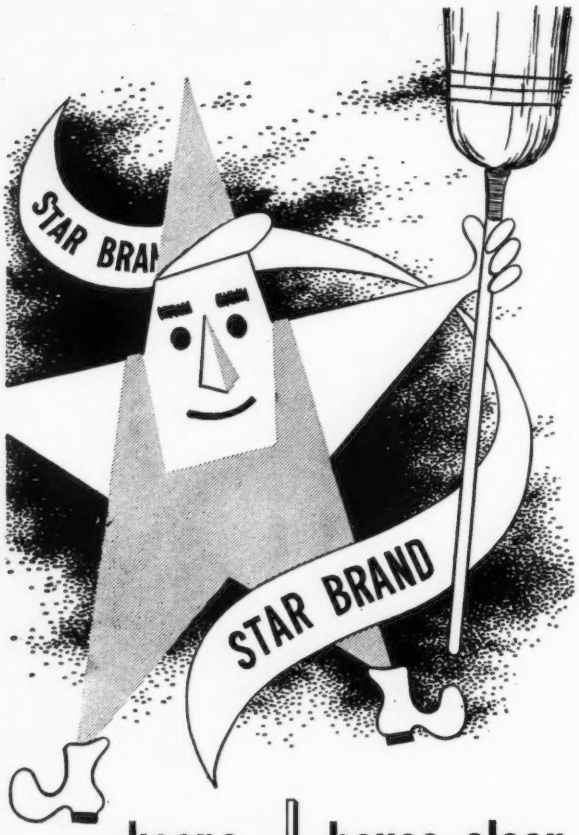
SANDOZ *thinks ahead with textiles*

SANDOZ



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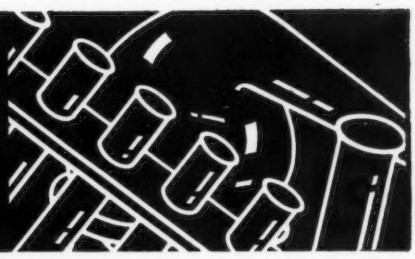

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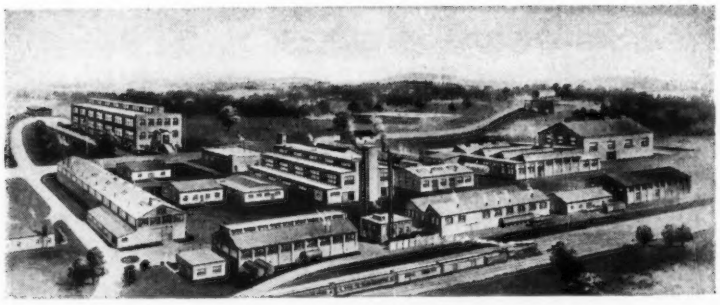

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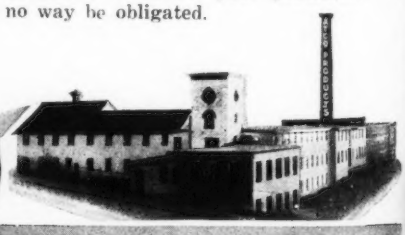

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Hetrosol for Rayon and Cotton Mixtures
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LAUREL Dull Finishes and Water Repellents

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Eliminates the use of soap
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The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

POSITION WANTED: Hosiery Dyer both technical and practical, with several years experience, capable of doing any hosiery dye job. Draft status 1-A-H. Box 592.

WANTED: Assistant dye house superintendent experienced in dyeing cotton, rayon, silk, both skein and package. Chemistry education and laboratory experience of primary importance. Must be able to supervise both dye house production and laboratory. Box 597.

WANTED: A textile specialty manufacturer who desires representation in the middle west. Box 599.

POSITION WANTED: Chemist, dyer, and superintendent, fourteen years experience on cotton, rayons and wool, all types of colors, on package and piece goods machines. Desires position as head dyer or assistant to general plant manager. Textile school graduate. Box 601.

WANTED: Dyehouse chemist with two or three years' laboratory training and experience in practical dyeing for large rayon dyehouse. Give full details of technical background and practical experience. Persons engaged in war work need not apply. Box 605.

POSITION WANTED: Textile chemist, 5 years experience, both in laboratory and plant work. Experimental, development and control work on printing, dyeing and finishing (resin) of cotton and rayons. Age, 26. Box 607.

WANTED: Colorist for standardization laboratory of dyestuff manufacturer. Location, East. State qualifications, education and salary desired. Box 608.

POSITION WANTED: Superintendent of dyeing, would consider a dyers job. Have had twenty-five years experience in dyeing Direct, Basic, Developed, Vat, Cotton, Rayon, Celanese, Linen and Spun Rayon and Wool. Reference if necessary. Box 610.

WANTED: Chemist, preferably with textile experience, with old established chemical manufacturing plant in Brooklyn. State education, experience and draft status. Box 614.

POSITION WANTED: Dyer, 27 years experience in dye business on all types of fabrics, including velvets, both silk and acetate type and discharge work (on silk, rayon and Acetate) for printing. General all around experience. Box 611.

POSITION WANTED: Boss Dyer and Superintendent of dyeing and finishing. 45 years old, draft exempt, can go anywhere if things are right, also have had twenty odd years experience dyeing of cotton, rayon and acetate crepe piece goods, boxes and jiggs, all kinds of women's dress goods and men's tie goods, also high class lining for men's smoking robes. Would like to go in partnership. Box 612.

POSITION WANTED: Bleachery superintendent, 42 years old, with over twenty years technical and practical experience in bleaching, dyeing and finishing of cotton and rayon piece goods. Box 613.

WANTED: Copies of Chemistry and Industry published by the British Society of Chemical Industry of No. 11, March 14th, 1942 and No. 14, April 3rd, 1943. Going rates will be paid for these. Box 615.

WANTED: District Sales Representative—An outstanding manufacturer of textile chemical processing specialties has an important position open in the states of Georgia and Alabama, for a man with the proper qualifications. A technical school graduate with practical mill background is essential. Unlimited opportunity for the Post War Period. In replying give complete business record for the past ten to fifteen years, references, family status, whether presently employed, and enclose recent snapshot (not returnable). Our organization knows of this advertisement. Box 616.

POSITION WANTED: Sales executive, successful record as an executive and sales manager of textile chemical specialties and dyestuffs. Several years experience in dyeing and finishing. Wide acquaintance with technical and executive personnel in all branches of the textile industry. Box 617.

NOTE

Essential employees need release statement. Employees who are to be hired for critical occupations need release statement and U. S. E. S. consent.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933, OF AMERICAN DYESTUFF REPORTER published bi-weekly at New York, N. Y., for October 1, 1944.

State of New York, County of New York, s.s.:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Alfred P. Howes, who, having been duly sworn according to law, deposes and says that he is the Publisher of the AMERICAN DYESTUFF REPORTER, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Alfred P. Howes, 440 Fourth Ave., New York, N. Y.; Editor—**Prof. Louis A. Olney, Lowell, Mass.; Managing Editor—Norman A. Johnson, 440 Fourth Ave., New York, N. Y.; Business Manager—None.**

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ALFRED P. HOWES, Publisher.

Sworn to and subscribed before me this 30th day of September, 1944.

(SEAL) CAROLINE ESSENBREIS

Notary Public, Kings County, Clerk's No. 148, Register's No. 51-E-5, N. Y. Co. Clk. No. 73, Reg. No. 50-E-5, Queens Co. Clk. No. 1788, Reg. No. 57-E-5. (My commission expires March 30th, 1945.)

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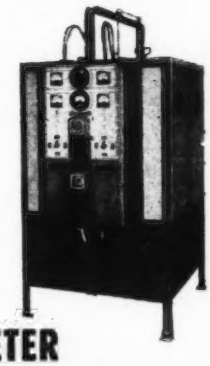

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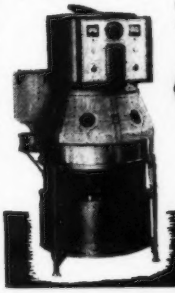

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***LANITOL:** An exceptional scouring agent and soap assistant, reduces cost and improves results of all boil-off or soaping operations.

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INDEX TO ADVERTISERS

Alrose Chemical Co.
Althouse Chemical Co.
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American Aniline Products, Inc. — Third Cover
American Cyanamid & Chemical Corp. — Second Cover
American Viscose Corp. — V
Aqua-Sec Corp. — X
Aridye Corp.
Arkansas Company — XXXIV
Arnold-Hoffman & Co., Inc. — XIX
Atlantic Chemical Co. — XXX
Atlas Electric Devices Co. — XXXIII
Becco Sales Corp.
Bick & Co., Inc. — XXIX
Burkart-Schier Chemical Co. — XXXV
Butterworth & Sons Co., H. W. — XXXVI
Calco Chemical Division, American Cyanamid Co. — XIII, XIV
Campbell & Co., Inc., John
Carbic Color & Chemical Co. — XXIV
Carbide & Carbon Chemicals Corp. — XVIII
Carbomatic Corp.
Ciba Company, Inc. — III
Colgate-Palmolive-Peet Co.
Commonwealth Color & Chemical Co.
Du Pont de Nemours & Co., E. I.
  Dyestuffs Division
  Electrochemicals Dept.
  Grasselli Chemicals Dept.
Electro Metallurgical Co.
Emery Industries, Inc.
Fancourt & Co., W. F.
Gardinol Corp.
Geigy Company, Inc. — Front Cover
General Chemical Co. — XXIII
General Dyestuffs Corp. — VII
Hardesty Co., W. C.
Hercules Powder Co.
Hooker Electrochemical Co. — XV
Houghton, & Co., E. F.
Industrial Rayon Corp. — XX
Kalf Manufacturing Co.
Kelco Co. — IX
Kilcommons Chemicals Corp.
Laurel Soap Mfg. Co. — XXXI
Mathieson Alkali Works, Inc.
Monsanto Chemical Co.
National Aniline Division, Allied Chemical & Dye Corp. — XXI
National Carbon Co. — XVII
National Milling & Chemical Co. — XXXIII
National Oil Products Co. — VIII
National Starch Products, Inc. — XI
New Jersey Zinc Co.
Nyanza Color & Chemical Co. — XXIX
Onyx Oil & Chemical Co. — VI
Pabst Sales Company
Perkins & Son, Inc., B. F.
Philadelphia Quartz Co. — XXVIII
Procter & Gamble
Quaker Chemical Products Corp.
Refined Products Co. — XII
Richmond Oil, Soap & Chemical Co., Inc. — XXXIII
Rohm & Haas Co.
Royce Chemical Co. — Back Cover
Sandoz Chemical Works — XXVII
Scholler Bros., Inc.
Society-Vacuum Corp.
Solvay Sales Corp. — XXVIII
Smith, Drum & Co.
Standard Brands, Inc.
Standard Chemical Products, Inc. — XXII
Stein, Hall & Co., Inc. — XVI
Tennessee Eastman Corp.
Ultra Chemical Works, Inc. — IV
Union Carbide & Carbon Corp. — XVII, XVIII
Van Vlaanderen Machine Co.
Wallerstein Co., Inc. — XXXIII
Watson-Park Company
Westvaco Chlorine Products Corp. — XXVI
Wolf & Co., Jacques
Young Aniline Works
Young Co., J. S. — XXX
Zinsser & Co. — XXX
Zurn Co., O. F. — XXXI

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NO. 10 OF A SERIES

EARLY DYERS

The first European treatise on dyes was published in Venice in 1429 under the title, "Mariegola del 'Arte de Tintori." This book, bringing together all that was known of dye processes at the time, had a profound effect in speeding the growth of the European textile industry. And the fall of Constantinople in 1452 brought to Italy many men well versed in the dye techniques of the near East. During the Renaissance there were over 200 dyeworks in Florence alone.

Skein Dyers of The Middle Ages

An author of the 16th century recognizes the importance of color in the scheme of life and tells us that each hue has its special use, for example—white for children, priests and young girls, green for jovial youths, bethrothed girls and newly wedded women, grey for mariners and laborers.

In the 17th century, tastes in color became so subtle that dyers tempted their clientele with names such as "Sad Friend", "Sick Spaniard", "Glad Widow" and others equally bizarre.

During the reign of Louis XIV in France, his minister Colbert established a distinction between dyers of fast colors and dyers of non-permanent colors. Colbert also appointed an official chemist to supervise the dye industry. Hellot, Macquer and Berthollet successively occupied this post.

In that day the business of textiles and dyeing was recognized as worthy of the efforts of the foremost chemists, just as it is today; for the products of the textile industry have always contributed and are contributing much to the protection, the comfort, and the pleasure of all mankind.

BURKART-SCHIER CHEMICAL CO.

Manufacturing Chemists for the Textile Industry—translating the discoveries of the laboratory into practical advances in the dyeing and finishing of yarns and fabrics.

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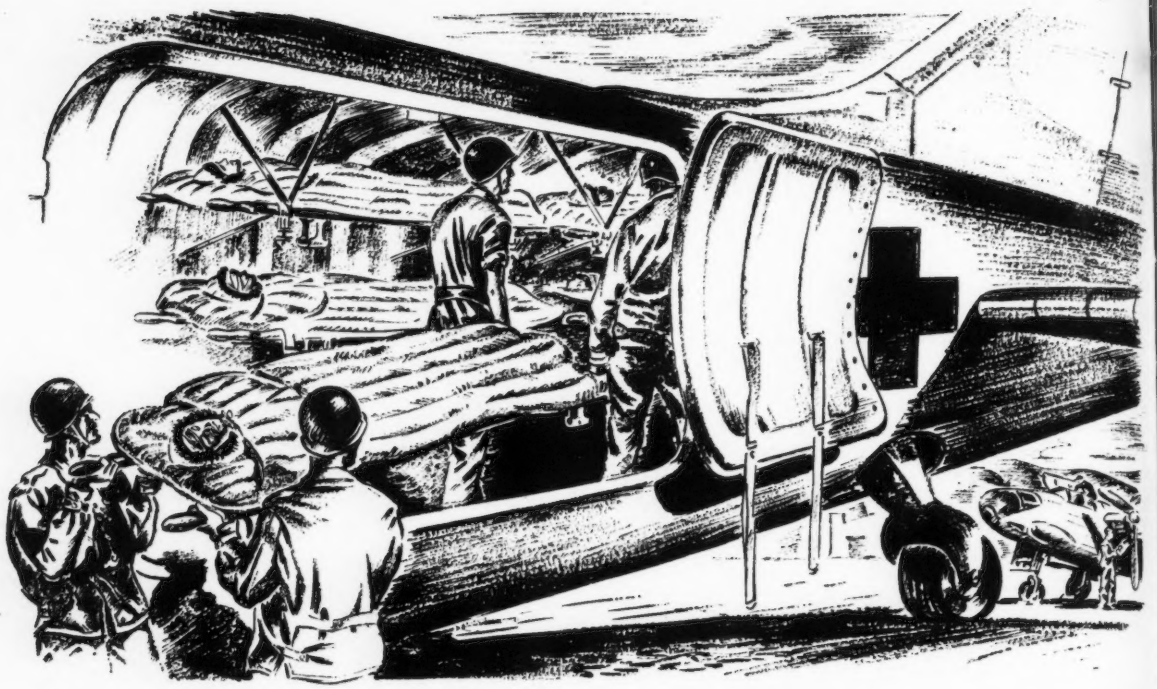
PENETRANTS DETERGENTS SOFTENERS REPELLENTS FINISHES



Cotton Keeps Wounded Warm in Air

The QMC has developed a new type sleeping bag to keep wounded soldiers warm during evacuation by air at high altitudes.

Made of water-repellent cotton duck on the outside and cotton balloon cloth on the inside, this new sleeping-bag weighs 24 lbs. Two feather-quilted mattresses are held together by slide fasteners. Ten separate zippers permit access to any part of the patient.

Heavy webbing strips sewn crosswise on the bottom mattress form three handles on each side.

Mills making fabrics for our Armed Forces depend on Butterworth Machines at every step in the Wet End of Textile Finishing... bleaching, boiling-out, drying, calendering, dyeing.

The cooperation of Butterworth Engineers is freely offered to mills seeking to achieve increased production, or to repair or replace wornout or obsolete equipment.

All of our facilities not required for Ordnance production are available to help you solve your finishing problems, and aid you in your postwar plans. Write for our folder "Announcing a Policy on Orders Taken Now for Post-War Delivery."

***64%**

of equipment now in use in the wet end of textile finishing cannot operate at a profit in competition with modern machines.

*Proved by Research

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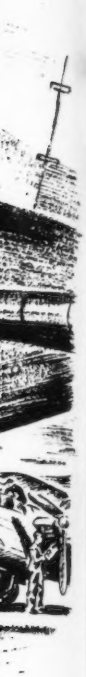
Butterworth

PRODUCING GUN MOUNTS FOR THE UNITED STATES ARMY



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LEVELENE*

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A penetrant and levelling medium for direct, union, and CELANESE* dyes. Effective either for stripping or for level dyeing when working with many of the vat type dyes.

A stable, dispersing penetrant for rotproof and mildewproof processing.

Economical and labor saving.

During the war LEVELENE* is proving of value in the processing of war goods.

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RATHER than ask for a laboratory sample —HAVE one of our technical men bring with him a sufficient quantity for a practical mill run THEN judge for yourself as many mills have done and profited thereby.

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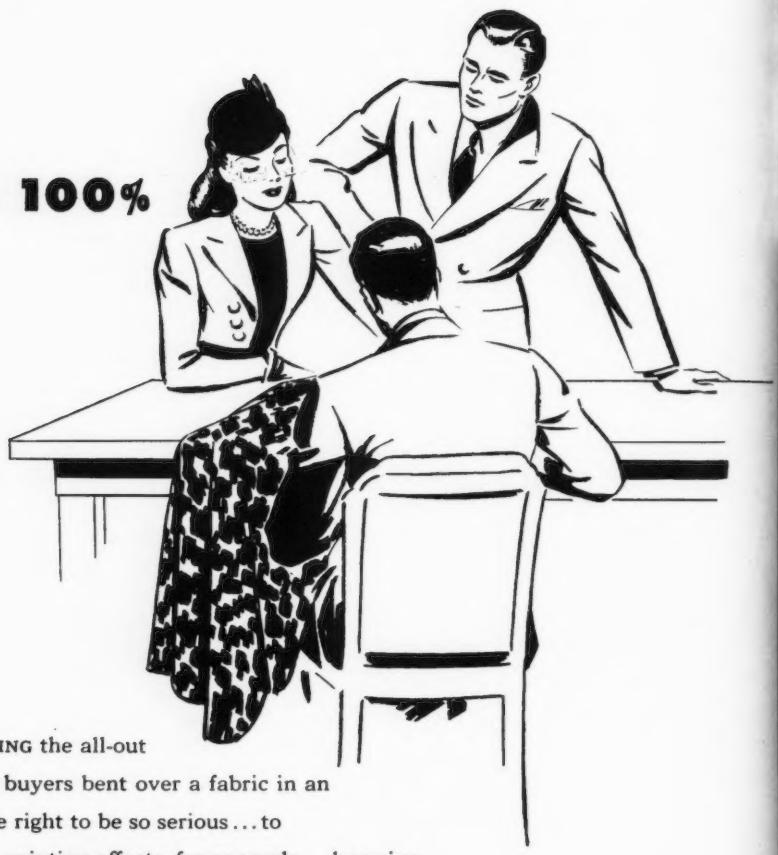

THERE'S NO INTERRUPTING the all-out concentration of today's buyers bent over a fabric in an office conference. They're right to be so serious ... to *severely* judge discharge printing effects, for example ... knowing post-war standards will be high. Better be set for such scrutiny with the right vat-color products, with a reducing agent such as DISCOLITE,* a sodium sulphoxylate formaldehyde economically supplied in 100% strength. Powerful, it is stable at high temperatures ... an effective ingredient of vat-colors and discharge pastes where it dries into the fabric yet retains its reducing efficiency. Use DISCOLITE in white discharge printing also ... and, speaking of concentration again, remember the Royce policy of focusing attention on a relatively few chemicals, assuring you the advantages of specialization. Ask a Royce man to call and tell you more.

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